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Chapter 2 – Affected Environment

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2.1 INTRODUCTION TO AFFECTED ENVIRONMENT

This chapter provides an overview of the Snake River Birds of Prey National Conservation Area (NCA) and describes the existing situation for each of the resource programs. It describes both the biotic (living) and abiotic (non-living) components that may be affected by the proposed actions. Components of the environment that will be unaffected by proposed actions, such as climate and physical characteristics, are also briefly described. Current management direction is briefly summarized for each program.

To make this document easier to read, we have used only the common name for plants and animals; a list of both common and scientific names can be found in the appendices.

This chapter also serves as part of the baseline data for identifying and analyzing the impacts of the four alternatives presented in this EIS. The alternatives are described in Chapter 3 while the environmental and socio-economic effects of the alternatives are described in the Environmental Consequences Chapter 4. Since not all areas of the NCA have the potential to achieve the desired future conditions (DFC) in the same manner and time-frame, the area has been divided into three management areas which reflect differences in soils, precipitation, fire history, seeding history, current vegetation, and site potential.

- **Area 1** encompasses approximately 31% of the NCA, and is located in the western portion of the NCA north of the Snake River. Area 1 has sustained the fewest wildfires (35% has burned), and supports the highest percentage of shrub cover (approximately 53% of the area supports a cover of native shrubs). This higher percentage of shrub cover allows Area 1 to support a greater amount of raptor prey base per unit area than can be supported in the other two areas. Raptor populations nesting along the downstream half of the stretch of the Snake River Canyon adjacent to Area 1 tend to be more stable and productive than those that nest along other stretches of the Snake River Canyon in the NCA.
- **Area 2** comprises 43% of the NCA, and encompasses the eastern portion of the NCA and the portion south of the Snake River. The shrub component has been reduced to approximately 34% of the overall vegetative cover. Approximately 44% of Area 2 has burned. Snake River Canyon segments that support raptor nest sites are also present in Area 2.
- **Area 3** encompasses the remaining 26% of the NCA and is generally located in the center of the NCA, north of the Snake River. Shrub cover is approximately 21%, and 69% of the area outside the OTA has burned.

Management Map 1. Because of differences in precipitation, soils, wildlife use patterns, seeding history, and current vegetation, the NCA has been divided into three areas to facilitate planning.

2.2 AFFECTED ENVIRONMENT FOR RESOURCES AND RESOURCE USES IN THE NCA

2.2.1 Air Quality

Description and Summary

National Ambient Air Quality Standards (NAAQS) are established by the Environmental Protection Agency (EPA) for criteria pollutants including ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead, and particulate matter. Air quality standards represent the maximum allowable concentrations of various pollutants necessary to protect public health with a reasonable margin of safety. The Idaho Division of Environmental Quality (DEQ) has the primary responsibility to carry out the requirements of the federal Clean Air Act (CAA) in Idaho. The primary mechanism for implementation is known as the State Implementation Plan, which EPA requires each State to prepare.

- By State law, Idaho cannot regulate agricultural burning.
- Agencies in Idaho coordinate prescribed burning through the Montana/Idaho Smoke Management Program certified by EPA and DEQ.

The 1977 CAA amendments clarified that the federal government is subject to the CAA requirements. The 1990 CAA amendments required EPA to establish the transportation and general conformity regulations. The Final General Conformity Rule, effective January 31, 1994, applies to non-transportation related federal activities, such as prescribed fire.

A conformity determination must be made for projects emitting air pollutants over specified levels to show that the projects will not contribute to any NAAQS violations. If a project is found to contribute to NAAQS violations, then emissions must be reduced or offset. (Copies of the NAAQS can be obtained from DEQ or EPA.).

Of the six air pollutants particulate matter (PM) is of most concern for the Bureau of Land Management (BLM) when it authorizes activities involving smoke emissions and dust. The majority of PM from smoke emissions is composed of organic and elemental carbon, and inorganic ash in the PM2.5 size class.

The EPA assigns classifications to geographic areas with respect to air quality conditions. When an area is considered for classification, there are three possible outcomes:

- Attainment – any area that meets the national primary or secondary ambient air quality standard for the pollutant.
- Non-attainment – any area that does not meet (or that contributes to ambient air quality in an area that does not meet) the national or secondary standard for the pollutant.
- Unclassified – any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Under the EPA's Natural Events Policy, the EPA may exercise its discretion to not designate an area as non-attainment if high PM10 concentrations are attributed to wildland fire. However, the State is required to develop and implement a Natural Events Action Plan (NEAP) to respond to the health impacts of natural events. In March of 2002, the DEQ completed a NEAP for Idaho in response to the extensive wildland fire events of 2000.

The CAA also establishes a national goal of preventing any further degradation or impairment of visibility within federally designated attainment areas. Attainment areas are classified as Class I, II, or III and are subject to the Prevention of Significant Deterioration (PSD) program.

- Class I areas include wilderness areas (larger than 5,000 acres) and national parks (larger than 6,000 acres).
- Class III status is assigned to attainment areas to allow maximum industrial growth while maintaining compliance with NAAQS.

- All other attainment areas are designated Class II.

Condition and Trend

The planning area is a designated Class II area. The Jarbidge Wilderness Area, located in Elko County, Nevada, is the closest PSD Class I designated area.

Limited data is available on the air quality of the NCA because no air quality stations are operating in this portion of Idaho. Some data gathered at a field study station near Silver City (CH2MHill 1994, pp 3-69 to 3-70) indicates that levels for PM10 and Total Suspended Particles (TSP) are well below the current federal and State standards. Average measured particle concentrations were 28.4 micrograms per cubic meter (ug/m3) for TSP and 20.1 ug/m3 for PM10. The PM10 concentration is well below the federal and State 24-hour standard of 150 ug/m3 and indicates the area has low levels of TSP and PM10. Other parameters, though not monitored, are believed to be below the federal and State standards due to a lack of emission sources.

Currently identified point and non-point sources of air pollution include BLM prescribed fires and Idaho Army National Guard (IDARNG) training activities, as well as the use of haul roads. The impacts of these sources are limited by requiring and implementing mitigation measures and/or standard operating procedures (SOPs) such as where road surfaces are treated with water or chemical dust suppressant(s) to reduce dust emissions.

Other sources affecting air quality are IDARNG operations (tank and vehicle maneuvers and live weapons firing), gravel and other material operations (fugitive dust from roads, construction, crushing, sieving, and other related operations). In these instances, operators are required to comply with regulations and standards. If standards will be or are being exceeded, operators are required to apply for the proper permits with the appropriate permitting agency. The BLM's role in these matters is non-regulatory. Other activities that remove vegetation and disturb the soil (i.e., vegetative treatments, livestock grazing, and OHV activities) also affect air quality by emitting fugitive dust.

2.2.2 Cultural and Tribal Resources

The BLM is responsible for identifying, evaluating, and protecting cultural resources on public lands. Cultural resources include archaeological, historical, and architectural properties, as well as traditional cultural properties that are notable for their traditional, cultural and religious values deemed important to American Indian Tribes and others. Tribal resources are described here as elements that support the customs and cultures of the local Tribes, such as ethno-botanical plants and spiritually significant sites.

All known cultural resources and any cultural resources discovered in the future would be assigned to one or more of the following Cultural Resource Use categories:

- Conservation for Future Use
- Scientific Use
- Traditional Use
- Public Use
- Experimental Use
- Discharged from Management

Description and Summary

In general, cultural resources have been identified through proactive surveys conducted under Section 110 of the National Historic Preservation Act of 1966 (NHPA), as well as project-related field inventories conducted under the requirements of Section 106 of the NHPA. The majority of cultural resource site data has been accumulated through Section 106 project compliance inventories. Observer information and historical records are also used to identify archaeological, historical, and traditional values.

Three types of cultural resource inventories are conducted to identify and assess cultural resource values on public lands:

- Class I inventories evaluate existing data from published and unpublished documents.
- Class II inventories involve sample surveys designed to characterize the probable density, diversity and distribution of cultural resources.
- Class III inventories entail continuous, intensive surveys to locate and record all cultural resources in a project area.

Several comprehensive overviews of prehistoric life in southwestern Idaho provide the important context with which to evaluate such properties (Gehr *et al.* 1982; Young 1987).

Historic ruins on Halverson Bar along the Snake River.

The NCA contains approximately 1,180 recorded cultural properties, representing a wide variety of site types from various time periods.

The known cultural resources include prehistoric sites, historic sites, and multi-component historic/prehistoric sites. These sites create an important record of human occupation and use of the environment that spans several millennia.

Based on inventories conducted to-date, the most common type of prehistoric site in the NCA is the lithic scatter, which may contain stone tools such as knives, arrows, spear points, and scrapers. More often, however, a lithic scatter may simply contain flakes of stone debris left during the process of making or sharpening stone tools. Other prehistoric site types include caves, habitation sites, rockshelters, burials, and rock art sites left by Native Americans. The Snake River Canyon provided protected residential locations and fishing stations for salmon that were an important resource.

The Great Basin, Plains, and Columbia Plateau cultures influenced the Native American inhabitants who lived within the NCA. Native American groups associated with all three cultural areas lived on, or traversed through, the lands within the NCA for thousands of years, during which time they hunted, fished, gathered plant foods, conducted religious ceremonies and buried their dead.

The Shoshone-Bannock Tribes of the Fort Hall Reservation and the Shoshone-Paiute Tribes of the Duck Valley Reservation continue to maintain an active interest in the NCA. Individual tribal members use public lands to gather plants or other natural materials, hunt, fish, and conduct religious rituals. The Shoshone-Bannock and Shoshone-Paiute nations continue to make connections to their past and create new cultural and religious sites within the NCA. The Tribes and the BLM routinely consult in government-to-government meetings to discuss proposed projects and their possible impacts to tribal resources.

The NCA was used in the historic period by fur trappers, emigrants on the Oregon Trail, gold miners, ranchers and homesteaders. The most common type of historic cultural resources, from the 19th century and the early part of the 20th century, include cattle and sheep camps; homesteads; mining camp remnants; town sites; miners' cabins; mine tailings and debris; stone monuments; ditches; depressions; and graves. Other historic period sites include transportation road networks, trails, ferry crossings, irrigation ditches, and historic trash dumps or scatters. Historical overviews and summaries may be found in cultural resource reports and books (Wyatt 1985, 1990; Plew 2001).

The Guffey Butte-Black Butte (GB-BB) Archaeological District was listed on the National Register of Historic Places in 1978 to protect over 200 known prehistoric sites in the area. The Archaeological District covers approximately 26,300 acres of public land extending along the Snake River Canyon from Guffey Bridge to Grandview and conforms to the original Birds of Prey Natural Area boundary, which was established in 1971. To provide additional protection against potential ground disturbing activities, such as mineral development and irrigated farming, the Archaeological District was designated as an Area of Critical Environmental Concern (ACEC) in 1984 (Cultural Map 1).

The South Alternate of the Oregon Trail, which roughly parallels the south side of the Snake River Canyon through the NCA, is designated as a Special Recreation Management Area (SRMA) and is managed under the 1984 Oregon Trail Management Plan.

Portions of the Oregon Trail and the GB-BB Archaeological District are in Visual Resource Management (VRM) Class I which minimizes the authorization of surface disturbing activities.

Other cultural resources include:

- Early cabin architecture at Wees Bar and Cabin Draw
- The ferry crossings at Crane Falls, Halls, and Dorsey
- Segments of the Oregon Trail
- Petroglyphs at Wees Bar and Celebration Park

Since only a small percentage of the NCA has been surveyed for cultural resources, it could potentially contain as yet undiscovered, but significant cultural sites that would require protection and management.

Currently, the BLM operates a modest outreach and interpretive program, which includes Archaeology Week presentations and the Spring Hikes environmental education series.

Condition and Trend

The condition and trend of cultural resources varies considerably due to the diversity of terrain, geomorphology, access, ground visibility, and past and current land use patterns. Artifacts, features, and/or structures are easily disturbed by wind and water erosion, animal intrusion, natural deterioration, and human activities. An example of this is the braided roads and trails created by off-road vehicle use in the Snake River Canyon, which, in some instances have impacted cultural sites. Some of these impacts have been mitigated by the improvement of a major road leading downstream from Swan Falls Dam. During this process, braided trails were physically closed with boulders and reseeded with native shrubs and perennial grasses. Although most users stay on the improved road because it is in the best condition, BLM cannot require users to stay off other roads or trails until they are officially closed through a route designation process. Route designation will occur following issuance of the RMP Record of Decision (ROD) or through area closures under the RMP.

Native American petroglyph at Celebration Park

Selected cultural sites in the Orchard Training Area (OTA) have been annually monitored since 1989 by the BLM and Boise State University, and a few sites outside the OTA have also been proactively monitored over the years. Based on limited monitoring, site form documentation, and other information, cultural site condition trend throughout the NCA is considered to be downward. This downward trend is based on the natural effects of erosion,

deterioration and decay. Active vandalism and illegal artifact collecting (unauthorized digging and "pothunting") has been observed in limited instances, but is currently not a major problem. Impacts caused by dispersed activities such as grazing and recreation have affected certain site locations. Natural deterioration and decay of standing structures at historic mining and homesteading sites is also a concern.

Although volunteers from the Oregon-California Trails Association, in cooperation with BLM, have been installing signs to mark and protect some segments of the Oregon Trail, a comprehensive survey of the Oregon Trail to determine the condition and impacts has not been accomplished. Cultural resource values are considered high based on: (1) interest expressed by members of local Tribes and communities, (2) known research interests of area scholars and other professionals, (3) documented site conditions, and (4) site visits by BLM staff.

2.2.3 Fish and Wildlife

In 1993 the NCA was established to conserve, protect, and enhance the densest known nesting population of raptors in North America and their habitats. In Idaho, the Idaho Department of Fish and Game (IDF&G) has primary responsibility for managing fish and wildlife populations. On public lands in the NCA, the BLM is responsible for providing suitable fish and wildlife habitat. This wildlife section begins with a general discussion of the various habitats that exist in the NCA, followed by a discussion of the nesting and migrating raptors that spend all or a portion of their year in the NCA. We then discuss the major raptor prey species, and identify other major wildlife groups that occur in the area. The NCA also provides habitat for over 300 additional wildlife species (Appendix 4) including:

- 55 mammals
- 18 reptiles
- 7 amphibians
- 27 fish
- an unknown number of invertebrate species

For additional information regarding Fish and Wildlife see the Special Status Animals Section 2.2.6.1.

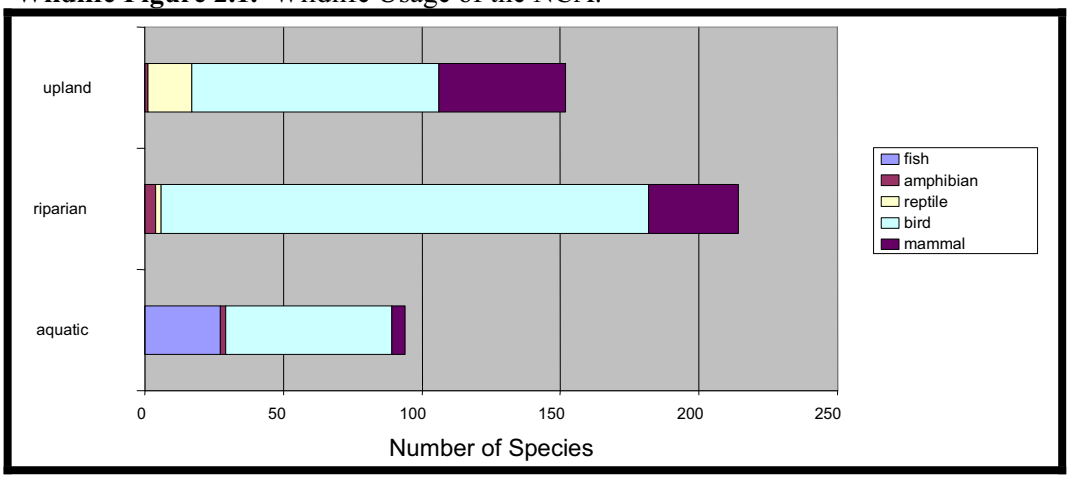
Prairie Falcon. The NCA supports North America's densest known raptor nesting populations.

Wildlife Habitat

Habitat provides necessary food, water, shelter, and space, without which wildlife could not exist. This section describes the NCA's three primary categories of habitat and their associated wildlife (Wildlife Figure 2.1). Many wildlife species inhabit more than one category, while some are tied to very narrow habitat parameters, such as fish.

BLM and the IDF&G jointly manage the TWMA ponds and Borden Lake. The IDF&G manages navigable waters in the State. Since the Snake River and C.J. Strike Reservoir are considered navigable, BLM only manages the public land above the high water mark. These riparian areas provide habitat for 27 fish, 6 amphibians, 4 mammals, and 68 birds, including American white pelican, trumpeter swan, black tern, and Barrow's goldeneye. Although the riparian areas are not managed specifically for waterfowl species, BLM's mandate to maintain or improve water quality benefits these species.

Wildlife Figure 2.1. Wildlife Usage of the NCA.



The following species can be found in riparian and wetland habitats in the NCA:

- Aquatic amphibians include leopard frogs and bullfrogs, which breed in water.
- The western garter snake is the most aquatic of the reptiles.
- Aquatic birds include loons, grebes, pelicans, cormorants, swan, geese, ducks, coot, gulls, and terns.
- Aquatic mammals include beaver, otter, mink, and muskrat.
- Aquatic insects include mayflies, caddis flies, mosquitoes, midges, backswimmers, water boatman, giant water bugs, whirligig beetles, water striders, dragonfly larvae, damselfly larvae, predaceous water beetles, and crane flies.
- Other invertebrates include crayfish, clams, mussels, snails, worms, leaches, copepods, scud, and shrimp.

Side-blotched lizard

Western Terrestrial Garter Snake

Wetland/Riparian Habitat

Riparian habitat is shoreline habitat that is affected by water in a pond, spring, stream, river or lake. Wetland habitat is found in bogs and marshes, shallow swamps, seeps, lakeshores, riparian areas and playas (usually dry basins that temporarily hold water after spring thaw or following periods of heavy rain.).

Native plants in many riparian areas are being replaced by exotic plants that are not utilized by many native animals. Russian olive and tamarisk-dominated riparian areas host few insects, and are infrequently used by songbirds for nest sites (OSU 2003, p 1; Weir 1998, pp 2-3, Gilman and Watson 1993, p 4; Colorado Weed Management Association 1999, p 1). Russian olives produce large crops of fruit that are eaten by many birds, especially in winter and early spring. Tamarisk does not produce seeds useful to wildlife. Neither plant is utilized by browsing animals. Beaver appear to be repelled by Russian olive and seldom cut them down, even when they are the dominant tree species within their territory (J. Doremus pers. obs.). Therefore, Russian olive tends to increase along river banks and reservoirs where native trees have been removed, further reducing important wildlife habitat. The lack of native trees and the insects they would support may have a negative effect on birds during spring migration.

Waterfowl are less productive because exotic weeds like European phragmites (Saltonstall 2002, p 2445), purple loosestrife (Thompson *et al.* 1987) invade riparian understories, forming dense stands in some areas that crowd out native emergent vegetation, thus, reducing the number of suitable nest sites. Phragmites seeds are eaten by some song birds, while loosestrife appears to have no wildlife value (Callihan and Miller 1994, p 37). Neither of these plants appears to be utilized as food by mammals. Riparian habitats invaded by these species are reduced in value for wildlife.

Migrating birds are especially abundant along the Snake River.

Canada thistle, white top, and perennial peppergrass grow most abundantly in damp soils. White top has adapted to drier conditions and can be found scattered over much of the NCA. Perennial peppergrass has appeared at a few upland sites. These plants are considered noxious weeds by the State of Idaho, and can grow in dense stands that not only crowd out native vegetation, but may also inhibit the movement of small animals. Although about 600 acres are treated each year for noxious and invasive weeds, they will continue to be a long-term management issue.

Millions of birds, including raptors, waterfowl, shore birds, upland game birds, and song birds migrate through the NCA each spring. Because it is considered a navigable stream, the Snake River is owned by the State to the high water mark. As such, the only aquatic habitat that is solely managed by the BLM is 2.4 miles along Sinker Creek.

Wetland/riparian habitats are used by more vertebrate animals than any other habitat. (Montan 1977, p 26) observed more rodents in riparian habitat than any other area in the NCA, including:

- Mammals such as woodrats, mice, voles, beaver, porcupine, marmot, and muskrat. Other mammals found in riparian/wetlands are shrews, mule and white-tailed deer, red fox, skunks, mink, weasels, raccoon, cottontail, gophers, and bats.
- Birds include herons, egrets, ibis, ducks, osprey, bald eagles, red-tailed and Swainson's hawks, sharp-shinned and Cooper's hawks, northern goshawks, ring-necked pheasants, California quail, Virginia rail, sora, shorebirds, gulls, terns, owls, hummingbirds, flycatchers, swallows, magpies and crows, chickadees, wrens, thrushes, vireos, warblers, sparrows, juncos, blackbirds, and finches.
- Reptiles include snakes and lizards.
- Amphibians include frogs and toads.
- Invertebrates include caddis flies, may flies, grasshoppers, moths, butterflies, bees, wasps, ants, beetles, dragonflies, damselflies, aphids, leaf hoppers, mosquitoes, scorpions, ticks, and spiders.

Upland Habitat

Upland habitat is a broad category that has been divided into six specific types: (1) greasewood, (2) salt desert shrub, (3) winterfat, (4) big sagebrush, (5) grassland, and (6) rock. Each of these types varies enough in structure and soil type to attract specific wildlife species. However, most species inhabit two or more types.

The NCA's wildlife populations are affected by climate, weather, and habitat quality. Of these, habitat quality is most affected by human activity. Loss of the native shrub steppe vegetation, combined with the invasion by non-native plants, has lowered the ecosystem's productivity, and resulted in a lower carrying capacity for native wildlife populations. There is less food for wildlife as the vegetation devolves from native shrub-grass to areas dominated by one or more exotic weeds and then to bare soil. Shrub-obligate animals find less useable habitat as shrub stands disap-

pear from fires, human activities, and drought. Some areas, such as portions of the Rattlesnake and Airbase allotments, near the Mountain Home Air Force Base, are undergoing desertification and are losing wildlife species.

Greasewood

Black greasewood habitat in the Snake River Canyon downstream from Swan Falls Dam

Greasewood is a common large shrub on saline bottoms just above the Snake River. Many greasewood flats have been converted to agriculture. Greasewood is often found along water courses through salt desert shrub habitat. Saltgrass and Great Basin wildrye are the native grasses most often found with greasewood. White top is a common noxious weed in this habitat. Stands of greasewood are important habitat for black-tailed jackrabbits, especially in winter. Mule deer, coyotes, cottontails, raccoons, and gophers are found in greasewood.

Western meadowlarks, loggerhead shrikes, sage thrashers, dark-eyed juncos, white-crowned sparrows, robins, northern harrier, short-eared owls, golden eagles, ring-necked pheasants, California quail, gray partridge, and magpies use greasewood habitat, as do gopher snakes, racers, striped whipsnakes, rattlesnakes, western whiptail lizards, side-botched lizards, leopard lizards, western fence lizard and horned lizards.

Amphibians found in greasewood habitat include spadefoot, western and Woodhouse's toads. Invertebrates include many of those found in riparian vegetation.

Salt Desert Shrubs

Salt desert shrubs are the common shrubs in areas of low precipitation, and include a wide variety of salt tolerant shrubs, including greasewood (discussed above), four-winged saltbush, spiny hopsage, shadscale, budsage, and winterfat (see below). Grasses commonly associated with this habitat are Indian ricegrass, needle and thread grass, and cheatgrass. Animals commonly found in this habitat include:

- Mammals – kangaroo rats, mice, pronghorn, coyotes, badgers, and jackrabbits,
- Birds – horned larks, lark sparrows, prairie falcons, ferruginous and red-tailed hawks, golden eagles, great horned owls, and burrowing owls.
- Reptiles – whiptail and leopard lizards, horned lizards, side-botched lizards, rattlesnakes and gopher snakes.
- Invertebrates – scorpions, spiders, beetles, ants, grasshoppers, butterflies, robber flies, gnats, flies, mosquitoes, moths, ticks, and fleas.
- Amphibians – spadefoot toads.

Winterfat

Winterfat is considered a salt desert shrub, but it can grow in areas of low salt content and does not grow in areas of high salt content.

Winterfat may be found in large stands with few other shrubs, in a mosaic with sagebrush or shadscale, or in mixed shrub habitat.

Animals common to winterfat areas include:

- Mammals – Piute ground squirrel, kangaroo rat, mice, jackrabbits, pronghorn, coyotes, badgers, white-tailed antelope squirrel,

- Birds – American kestrels, northern harriers, prairie falcons, ferruginous and red-tailed hawks, rough-legged hawks, golden eagles, turkey vulture, burrowing owl, horned lark, common nighthawk, common ravens, American pipit, loggerhead shrike, and lark sparrow.
- Reptiles – Rattlesnakes, gopher snakes, striped whipsnakes, racer, longnose snake, nightsnake, leopard lizard, whiptail, horned lizard, sagebrush lizard, spadefoot toad.
- Amphibians – spadefoot toads.
- Invertebrates – scorpions, spiders, beetles, ants, grasshoppers, butterflies, robber flies, gnats, flies, mosquitoes, moths, ticks, and fleas.

Big Sagebrush

Big sagebrush is found just above riparian habitat and in the wetter areas of upland habitats. It can be found in a mosaic with winterfat and less commonly shadscale. Sagebrush can often be found along water courses through winterfat and less commonly through salt desert shrub habitat. Animals common to sagebrush habitat include:

- Mammals – Mule deer, pronghorn, coyote, badger, jackrabbits, ground squirrels, mice, voles, kangaroo rats, long-tailed weasels, pygmy rabbits, cottontails, gophers, and least chipmunk.
- Birds – Turkey vulture, golden eagle, ferruginous and red-tailed hawks, prairie falcons, sage grouse, burrowing owl, short-eared owl, common nighthawk, horned lark, western meadowlark, sage and Brewer's sparrows, sage thrasher, loggerhead shrike, and raven.
- Reptiles – Gopher snake, rattlesnake, side-botched lizard, sagebrush lizard.
- Amphibians – Spadefoot toad, western toad, Woodhouse's toad, and pacific tree frog.
- Invertebrates – Spiders, scorpions, ants, beetles, butterflies, moths, flies, robber flies, grasshoppers, ticks, and fleas.

Grassland

Exotic grasslands are dominated by cheatgrass, medusa-head rye, or crested wheatgrass, while native grasslands are dominated by Sandberg's bluegrass. Grassland is found where shrub-grasslands have been disturbed by fire. Animals found in grasslands include:

- Mammals – Pronghorn; mule deer; coyote; badger; ground squirrels; mice, voles; and gophers.
- Birds – horned larks; long-billed curlews; prairie falcons; red-tailed; ferruginous; Swainson's hawks; burrowing owls; short-eared owls; ravens; and starlings.
- Reptiles – gopher snakes.
- Invertebrates – ants, beetles, butterflies, moths, grasshoppers, robber flies, flies, ticks, and spiders.

Rock

Rock outcrops, canyon walls, and talus are attractive to many animals for breeding, food, and cover. Animals that would be expected to use rock habitat type include:

- Mammals – bobcats, marmots, woodrats, raccoons, coyotes, skunks, cottontail, mice, and bats.
- Birds – Eagles, hawks, falcons, owls, geese, turkey vultures, chukar, swifts, swallows, wrens, phoebes, nighthawks, poorwills, ravens, starlings, rosy finches, house finches, house sparrows.
- Reptiles – rattlesnakes, whipsnakes, night snakes, ground snakes, longnose snake, black-collared lizards, side-botched lizards, and fence lizards.
- Amphibians – chorus frogs.
- Invertebrates – honey and leafcutter bees, wasps, ants, beetles, flies, centipedes, millipedes, spiders, scorpions, and fleas.

Raptors

A unique assemblage of raptors lives in the Snake River Canyon and adjacent lands of southwestern Idaho. This raptor aggregation, generally believed to be one of the densest in the world, is the reason for the NCA's exis-

tence. Raptors are relatively scarce animals even under the best conditions because they exist at the top of the food chain where the amount of energy available will support only small populations. Species with a small population size are at risk of extinction. Thus, anything that reduces the already small populations of raptors is especially critical to their survival (Marti 2002, p 1).

The lack of nest sites has been partially mitigated by construction of nesting boxes.

The first scientific studies of raptors in what is now the NCA were conducted in the mid-1960s (Hickman 1968), soon followed by Beecham (1970), Kochert (1972), and Ogden (1973). The BLM began research to investigate the ecology of raptors and their prey in 1972. BLM, United States Geological Survey (USGS) biologists, and researchers from various universities and other entities have continued that effort to the present. This section describes the raptor community with emphasis on important species, their prey and habitat, and other birds of the area that are considered to be special status species (SSS).

This unusual concentration of raptors exists because of the co-occurrence of two factors critical to their survival (USDI 1979, p. 2). One is that nest sites are very abundant in cavities, cracks, and ledges in the fractured basalt and eroded sandstone that make up the walls of the Snake River Canyon, numerous side canyons, and buttes that arise in the Snake River plain. Some of the cliffs are up to 500 feet (ft.) high. Still other nest sites are located in trees, on the ground, and even under ground. The second factor is the fertile, fine- and medium-textured loess soils that support grasses, forbs, and shrubs, which in turn sustain many small mammals, birds, reptiles, and invertebrates. These animal populations, especially Piute ground squirrels and black-tailed jackrabbits are prey for the raptors. Thus, the co-occurrence of abundant nesting sites and food supplies is the chief factor explaining why so many raptors occur in the NCA.

There are 25 raptor species that use the NCA during some portion of their life cycles (Wildlife Appendices 4, 5, 6 and 7). Sixteen species nest in the NCA, and the remaining nine occur there during migration or in winter. Prairie falcons, golden eagles, red-tailed hawks, northern harriers, and American kestrels are the most common diurnal species. Several owl species are also common, including the barn owl, great horned owl, long-eared owl, and burrowing owl, but, being nocturnal, except for the burrowing owl, their occurrence is much less noticeable than the diurnal species. Of the 16 nesting raptor species, 10 are year-round residents. Winter visitors include the bald eagle, rough-legged hawk, sharp-shinned hawk, and Cooper's hawk. See Appendix 5 Wildlife Table 1 – General Characteristics of Raptors in the NCA.

Raptors use diverse habitats in the NCA, nesting in three distinct zones: the cliffs, the uplands above the Snake River Canyon, and the riparian areas adjacent to the Snake River (Appendix 6 – Wildlife Table 2). Riparian

Red-tailed hawk chick

habitats are limited, occurring in narrow bands along the Snake and Bruneau rivers and several small streams. Isolated, small riparian areas also occur at seeps, springs, and intermittent streams. Trees in riparian areas are important nesting and roosting habitat for several raptors and are hunting habitat for some, including species found there only in the winter. Long-eared owls, northern harriers, western screech-owls, and saw-whet owls are the raptor species that nest in riparian areas of the NCA. Because many native trees have been replaced by invasive species, like tamarisk and Russian olive that provide less valuable roosting and nesting habitat, numerous nest boxes have been erected and are used by western screech-owls and northern saw-whet owls (Doremus 1992, p 356).

The Prairie Falcon times its annual breeding cycle to coincide with the seasonal activity patterns of Piute ground squirrels.

Status of Raptors and Factors Affecting Them

The best-studied raptor species in the NCA are the prairie falcon and golden eagle. Long-term monitoring has provided important insights about the status of both species (Steenhof *et al.* 1997, pp 350-366; 1999 pp 28-41), and as such, they are important barometers of habitat conditions. In addition, studies during the 1990s gathered information about the effects of fire and military activity on species that nest on the uplands above the Snake River Canyon.

Prairie Falcon

Prairie falcons typically nest on cliffs, outcroppings, or pinnacles in cavities, ledges, or nests of other raptors and ravens. The prairie falcon is a migratory raptor that times its annual breeding cycle to coincide with the seasonal activity patterns of ground squirrels (USDI 1996, p 78). Prairie falcons start returning to their NCA breeding areas in January soon after Piute ground squirrels emerge from six months of seasonal inactivity. Peak egg laying corresponds with the above-ground appearance of juvenile ground squirrels, which increases the abundance and availability of falcon prey. Prairie falcons leave the NCA in late June or early July when ground squirrels disappear below ground to escape the heat and dryness. Some prairie falcons return in fall and winter.

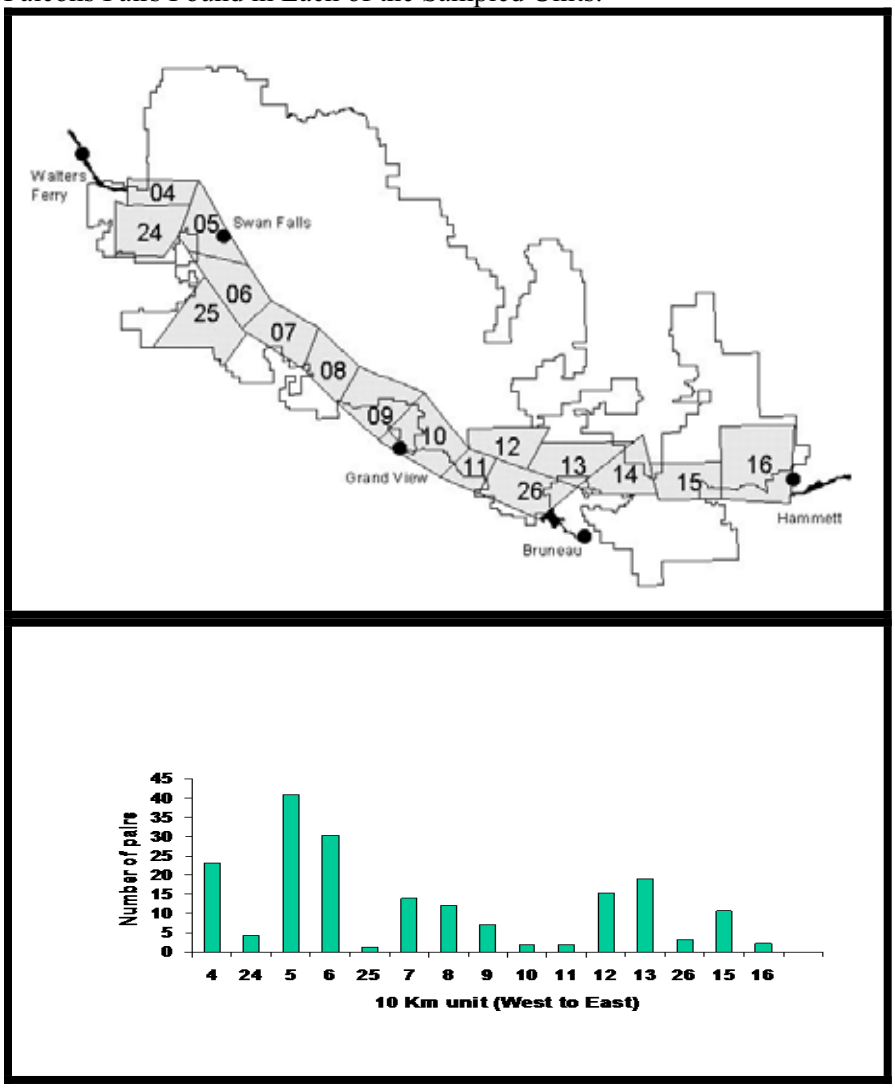
Although they are capable of preying on a wide variety of animals, breeding prairie falcons rely heavily on the Piute ground squirrel (Steenhof and Kochert 1988, p 41). Ground squirrels are the only species rich enough in fat to provide the calories needed by prairie falcons to raise broods of four to five young during a 3 to 4 month nesting season (USDI 1979, p 82). The prairie falcon population in the NCA probably consumes more than 50,000 ground squirrels in a single nesting season.

In the NCA, falcons hunt as far as 23 miles from their nests (Marzluff *et al.* 1997a, p 573), making surprise attacks on ground squirrels by covering as much area as possible in a low, contour-hugging flight (Steenhof 1998, p 5). Most falcons range north of the Snake River in a generally perpendicular direction from the Snake River Canyon (Dunstan *et al.* 1978, p 31; Marzluff *et al.* 1997a, p 575). Falcon foraging ranges are large (approximately 116 square miles), and individual foraging ranges overlap extensively. Foraging ranges contain more winterfat and native perennial grasses (especially Sandberg bluegrass) and significantly less salt desert shrub and exotic annual grass stands than expected based on availability (Marzluff *et al.* 1997a, p 579).

Prairie falcon nesting densities are higher in the NCA than anywhere else in the world. In a good year, more than 200 pairs nest in the NCA (Appendix 7 – Wildlife Table 3). In some parts of the Snake River Canyon, prairie falcon pairs nest within 330 ft. of each other.

In 1975, surveys found 165 pair of nesting prairie falcons along 78 miles (2.1 pair/mile) of the Snake River from Guffey Bridge to Indian Cove Bridge. Conversely, only 4 pairs were found in 36 river miles from Hammett, Idaho to the mouth of the Malad River (0.11 pair/mile) (Kochert *et al.* 1975, p 41).

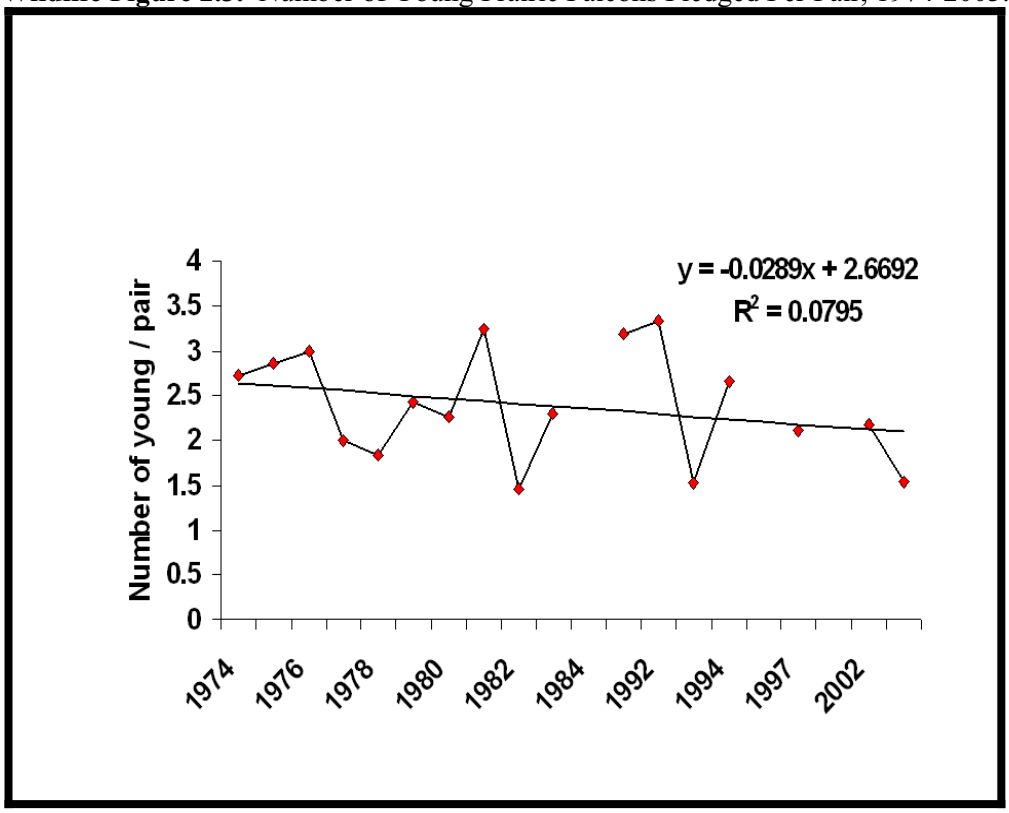
Wildlife Figure 2.2. Location of 10-km Units in the NCA and Mean Number of Prairie Falcon Pairs by 10-km Unit, 1976 to 2002. The First Figure Shows the Areas Sampled (with Identification Number for Each), and the Associated Graph Shows the Average Number of Nesting Prairie Falcons Pairs Found in Each of the Sampled Units.



Some have estimated that the NCA provides habitat for up to 5% of all the prairie falcons in North America (USDI 1979, pp 2-10). Numbers of nesting prairie falcon pairs have changed over the years, ranging from 159 to 217 pairs. However, there is no evidence for a declining trend. The number of pairs found in 2002 (217) and the number estimated in 2003 (204) were similar to numbers found in the 1970s (Kochert and Steenhof 2004, Table 6).

As with nesting densities, falcon productivity has shown wide swings since the fires of the early 1980s, but unlike abundance, productivity may be on a downward trajectory (Fig. 3). Prairie falcons do not shift readily from ground squirrels to alternate prey, and when ground squirrel abundance is low, they pay the price in lower reproduction (Steenhof and Kochert 1988, p 41 and Steenhof *et al.* 1999, pp 33-36). Although nesting pair numbers were near all-time highs, success and productivity of prairie falcons in 2002 and 2003 were below the long-term mean, and in 2003 these measures were the third lowest recorded in 17 years of monitoring from 1974 to 2003 (Kochert and Steenhof 2004,). Lower and more variable falcon productivity may reflect population changes of their main prey species. Ground squirrel abundance fluctuates more in disturbed grasslands dominated by exotic plant species, and the proportion of the NCA comprised of these grassland habitats has increased markedly over the past 20 years. Recent droughts have resulted in lower ground squirrel densities, particularly in areas dominated by exotic annuals (Steenhof *et al.* 2004, p 2). Drought and climatic changes may be affecting ground squirrel chronology and abundance that may, in turn, be affecting falcon productivity (Kochert and Steenhof 2004).

Wildlife Figure 2.3. Number of Young Prairie Falcons Fledged Per Pair, 1974-2003.



During the 1990s, falcon nesting success and productivity were significantly lower in the west-central region of the NCA (Fig. 2 units 7, 8, and 9) than in other parts of the NCA (Steenhof *et al.* 1999, p 35). This pattern continued in 2002 (Kochert and Steenhof 2003, p 9), but not in 2003 (Kochert and Steenhof 2004). During the 1990s, falcons from the west-central area were less effective at obtaining ground squirrels than falcons from the west area (Fig. 2 units 4, 5 and 6), especially during droughts (Marzluff *et al.* 1997a, p 576). The west-central region experienced the least shrub loss from 1979 to 1997, so shrub loss by itself does not explain the spatial differences in falcon reproductive rates (Steenhof *et al.* 1999, p 36). The west-central region has more shadscale communities, which support lower densities of ground squirrels (Smith and Johnson 1985, p172). In addition, falcons from the west-central region forage mainly in the OTA where military training activities occur. It is likely that military training activities have interacted with fire and livestock to create less than favorable foraging opportunities in the west-central stratum. Military training could affect prairie falcon foraging efficiency either by directly disturbing foraging behavior or by indirectly causing subtle habitat changes that adversely influence ground squirrels. If military training activity is affecting prairie falcons adversely, it is not yet understood what mechanisms might be involved (Steenhof *et al.* 1999, p 38).

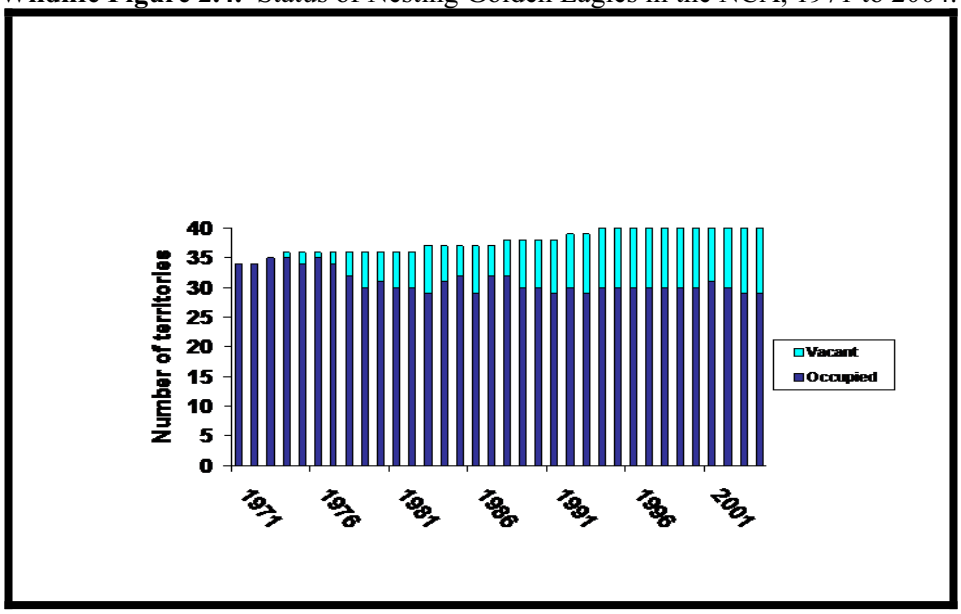
Golden eagle

Golden eagles are opportunistic predators and prey on a variety of animals (Kochert *et al.* 2002, p 8). In the NCA, eagle productivity is closely associated with the black-tailed jackrabbit population cycle. When rabbit numbers are high, eagle productivity is also high; more pairs lay eggs, more pairs are successful, and more young fledge (Steenhof *et al.* 1997, pp 354-360). Good jackrabbit habitat is an important component of good eagle habitat in the NCA. Other important eagle prey in the NCA includes Nuttall's cottontail, ring-necked pheasant, yellow-bellied marmot, and Piute ground squirrel (USDI 1979a, p 73, Steenhof and Kochert 1988, p 44). The golden eagle is a resident species and mostly hunts within about two miles of its nest (Dunstan *et al.* 1978, p 98; and Marzluff *et al.* 1997b, pp 673-686).

The **Golden Eagle** is a long-lived species that usually places its nests on cliff ledges. It may also nest in trees or on artificial structures. An important component of the Golden Eagle habitat is good jackrabbit habitat.

The number of golden eagle pairs showed a slight but significant negative trend between 1971 and 2004, but the decline has not been continuous (Fig. 4). The number of nesting pairs remained relatively stable—between 34 and 35—from 1971 to 1976. The number of pairs decreased to 29 pairs between 1977 and 1979 and remained stable from 1979 to 2004, ranging between 29 and 32 (Kochert and Steenhof 2005, p 5). In 2004, 29 pairs of eagles nested in the NCA.

Wildlife Figure 2.4. Status of Nesting Golden Eagles in the NCA, 1971 to 2004.

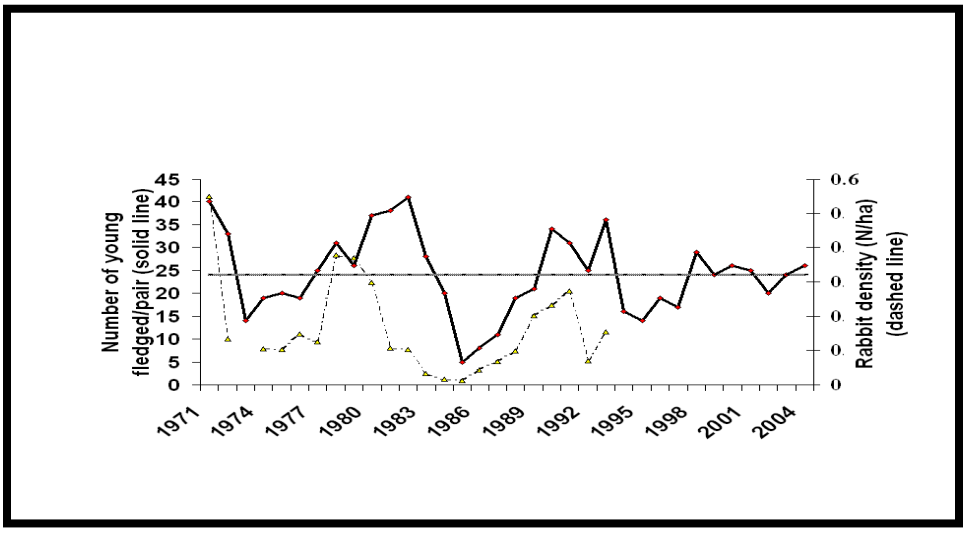


The combined shaded areas of Wildlife Figure 2.4 represent the total number of known territories each year. This total increased from 1971 to 1973 due to increased familiarity with the study area and from 1983 to 1994 due to the establishment of four new territories.

Half of the 40 known nesting areas in the NCA were vacant at least one year between 1971 and 2004. Eagles have reoccupied 12 of the 20 vacant territories. All but one was reoccupied within 5 years; however, one pair reoccupied a territory that had been vacant for 15 years. Neighboring pairs have subsumed at least four and possibly six vacant territories. In these cases, one pair is using two nesting territories formerly occupied by two pairs. Once a territory is subsumed, pairs are less likely to reoccupy these territories. By 2004, there had been a net loss of six pairs since the early 1970s. The decline in number of occupied eagle nesting territories, combined with the apparent decline in black-tailed jackrabbits suggests a reduced carrying capacity for golden eagles in the NCA (Kochert and Steenhof 2005, p 6).

In contrast to the number of breeding pairs, productivity of golden eagle pairs did not show a negative trend (Kochert and Steenhof 2005, p 7; Fig. 5). Although the total number of young fledged per year varied considerably, the amplitude of the variation has dampened since 1993, fluctuating around the long-term mean for the population. The major decline in productivity during the mid-1980s was associated with catastrophic wildfires that occurred primarily between 1981 and 1985 (Kochert *et al.* 1999, p 17). At about the same time black-tailed jackrabbits, the eagles' main prey, experienced a cyclic decline in numbers (Steenhof *et al.* 1997, p 350). Wildfires may have accentuated the severity of the rabbit decline in the 1980s, and rabbit numbers are not reaching the highs they once did. The total number of young eagles fledged annually has remained relatively stable since the late 1990s. Data suggest that the less productive territories have become vacant, and that the remaining core of pairs continues to be productive (Kochert and Steenhof 2005, p 7). Radio telemetry studies showed that eagles use burned habitats less than expected in relation to their abundance; they avoid grass habitats (Marzluff *et al.* 1997b, p 687). Eagles appear to have compensated for the loss of shrub habitat by expanding their ranges, using alternative habitats, and preying less on jackrabbits and more on alternate prey (Marzluff *et al.* 1997b, p 681 and Kochert *et al.* 1999, p 1).

Wildlife Figure 2.5. Total Number of Young Golden Eagles Fledged in the NCA in Relation to Black-tailed Jackrabbit Densities. Horizontal Line Equals the Long-term Mean Number of Eagles Fledged, 1971 to 2004.



Other Raptors

Raptor species that nest on the uplands above the Snake River Canyon include ferruginous hawks, burrowing owls, short-eared owls, and northern harriers. These species nest on the ground, in burrows, in shrubs, and on artificial nesting platforms. The Pacificorp 500-kV transmission line that traverses the NCA provides nesting substrate for a variety of raptor species (Steenhof *et al.* 1993, p 275). The upland nesters have been relatively resilient to habitat changes.

Northern Harrier

The northern harrier is found across most of Idaho (Stephens and Sturts 1998, p 19). Northern harriers nest on the ground in emergent vegetation, hay and grain fields, and tall grass. They are unaffected by wildfire, and nest in burned habitats significantly more often than expected. They also prefer to nest in patches of Russian thistle and stands of tumble mustard that have invaded disturbed areas (Lehman *et al.* 1996b, p 6). Northern harriers can be found year round, but it is not known if birds that nest here also winter here. During years of abundant small mammals, northern harriers can be one of the most abundant nesting raptors in the area. The breeding population of harriers is tied to prey abundance. When small mammal populations are low, few northern harriers nest in or near the NCA.

Sharp-shinned Hawk

Sharp-shinned hawks are forest nesting hawks that prey on small birds. In Idaho, they are found over most of the State (Stephens and Sturts 1998 p19). They nest at higher elevations than the NCA. In the NCA, sharp-shinned hawks are spring/fall migrants and winter residents.

Cooper's Hawk

Cooper's hawks nest in trees in forests, riparian areas, farms, and towns. They primarily eat small birds, but they do take small mammals. They nest at higher elevations than the NCA (Stephens and Sturts 1998, p 19). In the NCA they are spring/fall migrants and winter residents.

Northern Goshawk

In Idaho, northern goshawks are found over much of the State (Stephens and Sturts 1998, p 19). They nest at higher elevations than the NCA. In the NCA, they are spring/fall migrants and winter residents. They feed on small to medium size birds and mammals.

Red-tailed Hawk

This is the most common large soaring hawk in North America, as well as the NCA. It is found throughout Idaho (Stephens and Sturts 1998, p 20). In the NCA, it nests on cliffs, trees, and rarely nests on platforms. Red-tailed hawks feed on insects, amphibians, reptiles, birds, and especially on mammals from shrews to jackrabbits. The Piute ground squirrel is their most common prey (USDI 1976 pp 35-36). There have been no recent counts of occupied red-tailed hawk nesting sites.

Ferruginous Hawk

In Idaho, ferruginous hawks nest in the southern half of the State and winter in small numbers in the south and southwestern counties (Stephens and Sturts 1998, p 20). They winter from southern Idaho south into Mexico (Sibley 2000, p124). They nest in trees and shrubs, on cliffs, pinnacles, rock outcrops, buttes, banks, slopes, and utility structures. In the NCA, they also nest on military towers and artificial nest platforms. They feed heavily on small mammals, but also eat birds, reptiles and insects. Ferruginous hawks are unique among the NCA's raptors in that they forage and nest selectively in grassland habitats (Lehman *et al.* 1996a, p 1). Many of their nests are within or near the OTA. Ferruginous hawk populations have not decreased after wildfires and in fact, may have increased slightly.

Rough-legged Hawk

The rough-legged hawk is found in the southern two-thirds and western edge of Idaho (Stephens and Sturts 1998, p 27) during the winter. They usually appear in the NCA in October and are gone by June.

Bald Eagle

See Special Status Animals Section 2.2.6.1.

Osprey

In Idaho, osprey nest over much of the State (Stephens and Sturts 1998, p 18), and in 1999 were found nesting when Idaho Power Company raised the height of utility poles across the Snake River below C.J. Strike Dam (J. Doremus 1999 field notes 26 Apr.). A second nest site is located along the Snake River north of the mouth of Castle Creek. In Oregon, 99+% of osprey's diet were fish, and on the Willamette River, 85% of fish taken were large scale suckers (USGS 2002, pp 1-2). No study has been done on what species of fish are taken by osprey in the NCA.

Merlin

In Idaho, merlins have been found breeding in northern and south-central Idaho (Stephens and Sturts 1998, p 21). Merlins are migrants through and winter residents in the NCA, feeding mostly on small birds.

American Kestrel

The North American kestrel population winters as far south as Panama (Ehrlich *et al.* 1988, p 244). In the NCA, kestrels nest in cliffs, buildings, nest boxes, and cavities in trees. Kestrels eat insects, reptiles, small mammals, and birds.

Peregrine Falcon

See Special Status Animals Section 2.2.6.1.

Gyrfalcon

When the population of Gyrfalcon's favorite prey (ptarmigan) reaches low levels, gyrfalcon will migrate south to find food. They also eat shorebirds, ducks, sea birds, grouse, rabbits and ground squirrels. They are seen across North America as far south as the northern contiguous States (Sibley 2000, p 132). Winter gyrfalcons have been seen several times since 1975, but generally are rare winter visitors to Idaho (Stephens and Sturts 1998, p 21).

Barn Owl

Barn owls breed and winter along the western Idaho border and south of the Snake River (Stephens and Sturts 1998, p 37). They nest in cavities and crevices in cliffs and dirt banks, tree hollows, hay stacks, and buildings. In the NCA, most are cliff nesters. Their population fluctuates with weather and prey abundance.

Long-eared Owl

Long-eared owls nest across most of Idaho and winter along the western and southern edge (Stephens and Sturts 1998, p38). Long-eared owls eat mostly small rodents, but occasionally take reptiles, amphibians, and birds. In the NCA, long-eared owls nest in riparian areas in the nests of magpies, crows, and raptors. They may nest in cliffs in small numbers. After breeding they migrate out of the NCA to the mountains to the north and east (Ulmschneider 1990, p 59). In late October, long-eared owls return to the NCA where they form winter roosts of one or two owls up to 100 (Marks pers. com.). As many as 63 pairs of long-eared owls have nested in the NCA (Marks 1981 p 29). No recent monitoring has been done for this species.

Short-eared owl

See Special Status Animals Section 2.2.6.1.

Great Horned Owl

Great horned owls are found throughout Idaho (Stephens and Sturts, p 37), nesting in cavities and on cliffs, in tree cavities and raptor, crow, raven and squirrel nests, in hollow logs, on the ground among boulders, and in barns and abandoned buildings. They feed on small rodents and mammals up to the size of porcupines and Artic hare, birds up to the size of Canada geese and wild turkey, amphibians, reptiles, fish and scorpions. They also feed on smaller raptors. In the NCA, great horned owls nest in cliffs and trees. Along linear cliffs, pairs nest about two miles apart.

Great horned owl and **magpie.** Cliffs with side canyons usually have a higher density of nesting great horned owls.

Northern Saw-whet Owl

These owls usually nest in coniferous or mixed coniferous/ deciduous forests (Peterson 1990, p 202). In Idaho they nest or winter over the whole State (Stephens and Sturts 1998, p 39). In the NCA, saw-whet owls have been found breeding in nest boxes for several years since 1986. These boxes are in riparian areas and shrub-scrub steppe desert among native willows and cottonwoods, or Russian olives and black locust. They appear to breed during times of high small mammal populations.

Saw-whet owl

Burrowing Owl

See Special Status Animals Section 2.2.6.1.

Western Screech-owl

In Idaho western screech-owls breed and winter along the western and southern edge of the State (Stephens and Sturts 1998, p 37). In the NCA, screech-owls are found breeding in woody riparian, woodland, and cliffs. They are cavity nesters that readily use nest boxes. They feed on small mammals, birds (especially in winter), and occasionally lizards, amphibians, fish, and insects.

Turkey Vulture

The turkey vulture is not a raptor, but because of body shape, habitat use, and flight characteristics, it is often mistaken for eagles or large soaring hawks. Genetic data show a clear relationship between "New World" vultures and storks (Sibley 2000, p

Turkey Vulture

106). They are found throughout the NCA during spring and summer and nest in caves in cliffs, often the cave of choice is at the base of the cliff (J. Doremus pers. obs.). They feed on carrion as long as it is fresh (Bammann pers. obs). Group roosts are found at Swan Falls Dam and the Bruneau Marsh (J. Doremus pers. obs.).

Common Raven

The common raven is the largest songbird in North America, and is often mistaken for a bird of prey because of its large size, habitat use, and propensity to soar. They are found from deserts to mountain tops. They often scavenge or glean, but they also hunt live prey from insects to animals as large as ground squirrels. They nest on cliffs, in trees, and on utility poles, and less often on other man-made structures. They are one of the most common large nesting birds in the NCA. Winter roosts of more than 2,000 ravens have been seen (Engel *et al.* 1987, p 38).

Other Raptors

The red-shouldered hawk, snowy owl, and great gray owl have each been seen one time only in the NCA. The barred owl has been spotted four times (Doremus, pers. comm.).

Key Raptor Prey Species

Raptor prey species are not quite as varied, but include insects, jackrabbits, geese and carp. Even fawn mule deer and pronghorn are taken by golden eagles on rare occasions. All raptors take a variety of prey, but some raptors are so dependent on certain prey species that the occupation of nest sites and productivity depend on the distribution and density of these prey species.

The term "keystone species" is used to note species that can dramatically alter the structure and dynamics of ecological systems and through predator/prey, competitive and mutualistic interactions with other species. By causing physical disturbance, keystone species can have a disproportionately large effect on habitat structure, species composition, and biochemical processes (Brown and Heske 1990, p 1705). In the NCA's loess soils and in some lakebed sediments, the Piute ground squirrel is the keystone species in the NCA. In saline soils it may be kangaroo rats, but their populations have not been studied in the same detail as Piute ground squirrel populations.

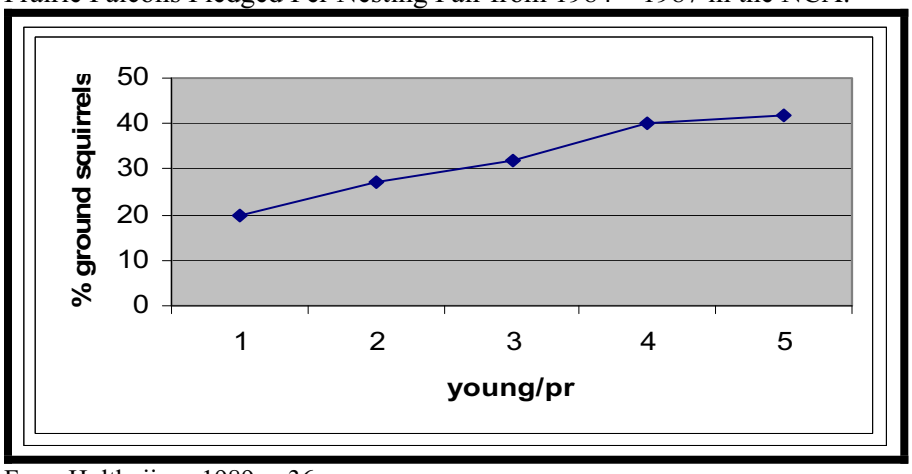
The most important prey species for diurnal raptors in the NCA are Piute ground squirrels, black-tailed jackrabbits, and Nuttall's cottontails. Other small mammals, including deer mice, montane voles, and kangaroo rats, are eaten mainly by nocturnal owls, but also by several diurnal raptors. A wide variety of small and medium sized birds are preyed upon by all the raptor species, but no single species is an important diet item. Reptiles are important prey of red-tailed hawks and are eaten in smaller numbers by many other raptors. American kestrels and burrowing owls take many large insects (Marti *et al.* 1993, pp 8-9). Swainson's hawks also eat grasshoppers in late summer (England *et al.* 1997, p 9).

Piute Ground Squirrel

Piute ground squirrels, formerly considered to be a sub-species of Townsend's ground squirrel (Hoffmann *et al.* 1993), are important prey for many raptors in the NCA. They are critical food of prairie falcons (Fig. 6) and important food for red-tailed hawks, ferruginous hawks, and other raptors and common ravens (USDI 1979a, p 82; Marti *et al.* 1993, p 8). Several mammalian and reptilian predators also feed upon Piute ground squirrels (Marti *et al.* 1993, p 9). In addition to their importance as raptor prey, these squirrels may increase primary productivity by loosening, aerating, and mixing soils (Yensen 2001, pp 1-3).

The most important prey species for diurnal raptors in the NCA are **Piute ground squirrels.** Almost every animal in the NCA could be considered a prey species.

Wildlife Figure 2.6. The Relationship of the Percentage of Ground Squirrels in the Diet of Nesting Prairie Falcons and the Number of Young Prairie Falcons Fledged Per Nesting Pair from 1984 – 1987 in the NCA.



From Holthuijzen 1989, p 36.

Piute ground squirrels are found in the Great Basin and Columbia Plateau of Utah, Nevada, California, Oregon, and Idaho (Yensen and Sherman 2003, p 14). They dig burrows for shelter and in the NCA, mostly on the north side of the Snake River (USDI 1979a, p 28), are usually found in conjunction with deep loess soils that can be excavated easily and do not readily collapse (Johnson and Melquist 1975, pp 164-165). A survey of the desert north of the Snake River from Hammett Hill Road to King Hill found ground squirrel and badger sign in abundance east to Bennett Mountain Road. The lack of suitable nesting cliffs may account for the lack of prairie falcons nesting along this stretch of the Snake River. Both ground squirrel and badger holes are much less abundant east from Little Canyon Creek where the soil changes to very shallow clay over basalt.

Piute ground squirrels in the NCA are active during the day, but come above ground for only about six months or less in a year, emerging from torpor in January or February. In years when their food supply is adequate, they mate, produce young, double their body weight, and retreat underground to once again undergo torpor in late June to early July when summer temperatures rise and the plants they depend upon for food dry up. Piute ground squirrels have one litter of up to 10 young per year. Their breeding chronology may have shifted during the past 20 years in response to climate change and/or habitat alteration (Steenhof *et al.* 2004, p 15). Long-term shifts in ground squirrel breeding chronology may have implications for raptors that depend on them for food.

Smith and Johnson (1985, p 174) found that Piute ground squirrels feed heavily on native and exotic grasses, but they also consume grass seeds, especially in late seasons of drought years (USDI 1979a, p 28; Van Horne *et al.* 1997, pp 527-528 and Van Horne *et al.* 1998, p 295). Drought affects squirrels more in altered grass communities than in native shrub habitats (Van Horne *et al.* 1997, pp 304-305). Although squirrel densities tend to be higher in exotic annual grass communities in years with high precipitation, ground squirrels in big sagebrush habitats had higher survival rates, higher densities, and higher productivity after drought than squirrels in grassland habitats (Van Horne *et al.* 1997, pp 304-305). In 2003, squirrels weighed more on sagebrush sites than in grassland sites (Steenhof *et al.* 2004, p12). Over the long term, shrub habitats clearly provide a more favorable and stable environment than grass habitats for squirrels (Yensen and Quinney 1992, p 269; Van Horne

et al. 1997, pp 304-305 and Steenhof *et al.* 2004, p 16).

Black-tailed Jackrabbit

This hare is found in shrub and grasslands throughout the West where it undergoes population cycles of 7 to12 year intervals where the ratio between peak population numbers and low populations can be as great as 135:1 (Anderson and Shumar 1986, p 154).

Black-tailed jackrabbits reach their highest densities in the NCA near big sagebrush and black greasewood stands (Smith and Nydegger 1985, p 701, and Knick and Dyer 1997, pp 75-84). From 1977 to 1989, black-tailed jackrabbit densities averaged 0.12/acre for all habitat types and 0.25/acre for big sagebrush habitats (Doremus *et al.* 1989, pp 91-92). Habitat for black-tailed jackrabbits has been significantly reduced since 1980 because of wildfires that burned sagebrush (USDI 1996, p 58). Densities during low population years (mid-1980s) ranged from 0.02 to 0.4/acre, and from 0.5 to 0.9/acre in high population years; peaks of the black-tailed jackrabbit population cycle have decreased from 1971 to 1996 (USDI 1996, p 56).

The black-tailed jackrabbit is an important part of the golden eagle diet and is eaten by other raptors as well (Marti *et al.* 1993, p. 9.)

Montane Vole

This small rodent is an important prey for many raptors, especially owls, kestrels, and northern harriers. Montane voles made up 43% of the biomass of prey fed to young sawwhet owls in 1986-1987 and from 1990-1993 and 24% of the prey biomass fed to western screech-owls in 1992 (Doremus and Marks 1988, p 691; and Rains 1998, p 37). Marks (1984, p 1529) found montane voles made up 16% and 15% of prey biomass in 1980 and 1981, respectively, in long-eared owl casts found during the breeding season. Marti (1988, p 1805) found that voles constituted over 55% of prey taken by barn owls in the NCA.

Montane voles generally occupy moist to wet habitats with thick grass or forb cover, including irrigated pastures and hayfields. They also occur in drier grasslands with forbs and sagebrush, but usually in lower numbers. No information is available in regard to distribution or population densities in the vicinity of the NCA, but occurrence in raptor diets suggests these voles occur most commonly in irrigated alfalfa fields and pastures (Marks and Marti 1984, p 140).

Nuttall's Cottontail

Nuttall's cottontails, also known as mountain cottontails, are found across the southern half of Idaho and throughout the NCA where there is suitable habitat. Nuttall's cottontails are most often found in areas of tall shrubs, rock outcrops, broken canyons, riparian vegetation, agriculture, and talus. Their population can vary greatly over time but it is not known if this is a cyclic variation like that found in hares or a response to climatic conditions and disease. In 1976, cottontails made up about 18% of mammalian biomass and 13% of all prey biomass found in golden eagle nests, 5% of total prey biomass found in prairie falcon nests, and 17% of prey biomass found in red-tailed hawk nests (Kochert *et al.* 1976, pp 35-36). Cottontails are also eaten by rattlesnakes, long-tailed weasels, coyotes, bobcats, ferruginous and Swainson's hawks, ravens, great horned and long-eared owls, and occasionally western screech-owls.

Kangaroo rats

The Ord's kangaroo rat is found across southern Idaho, and the Great Basin kangaroo rat is found in southwestern Idaho (Burt and Grossenheider 1959, p 96). Both species are found in the NCA. Ord's kangaroo rats are found in a wide range of habitats, while the Great Basin kangaroo rat is usually found in salt desert shrub habitat. Kangaroo rats are

eaten by many of the NCA raptors; however, because these rodents are mostly nocturnal, they are more important in diets of owls (barn, long-eared, and great horned owls, in particular) than diurnal raptors (Marti *et al.* 1993, p 9). Even though they are mostly nocturnal, kangaroo rats are also taken by golden eagles, prairie falcons, red-tailed, ferruginous, and Swainson's hawks, American kestrels, and northern harriers, as well as by rattlesnakes, gopher snakes, longnose snakes, long-tailed weasels, badgers, coyotes, and bobcats (Wildlife Figure 2.7).

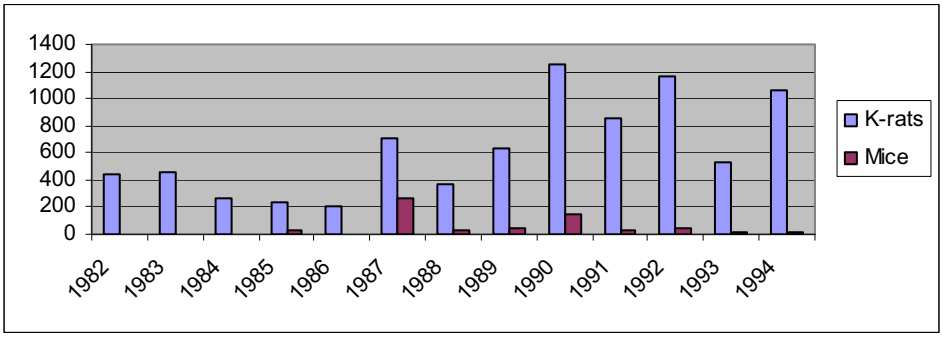
Deer mouse

The deer mouse is a common, ubiquitous mouse eaten by all the NCA raptors (Fig.7), but is important only in the diet of owls, especially long-eared and barn owls (Marks and Marti 1984, p 137). In the NCA, they appear to be the most common small mammal (USDI 1979a, p 32), and as such, are taken by almost every type of predator. Deer mice were over 6% of the biomass in the diet of barn owls (Marti 1988, p 1805). They were over 16% in 1980-1981 (Marks 1984, p 1529) and over 20% in 1988-1989 (Ulmschneider 1990, p 75) of the biomass in long-eared owl diets. They also made up 16% of prey biomass from nest boxes used by northern saw-whet owls in 1986-1987 (Marks and Doremus 1988, p 691) and 17% in 1990 to 1993 (Rains 1998, p 37). Eight percent of individual prey items found in six nest boxes used by western screech-owls in 1980 (Doremus and Marks 1982, p 53) and 11% of the prey biomass of nesting screech-owls in 1992 (Rains, 1998, p 42) were deer mice. They reach their highest population densities in canyon talus and riparian areas (220 to 324/acre). In upland habitats, they are most common in big sagebrush and mixed big sagebrush and winterfat (32 to 264/acre), and greasewood areas (22 to 282/acre) (USDI 1979a, p 33). Abundance of deer mice in burned shadscale habitats in the NCA was lower for at least one year after the fires (Groves and Steenhof 1988, pp 207-209). Deer mice densities tend to be lower in cheatgrass-dominated habitats than in native shrub communities (Gano and Rickard 1982, p 1).

Other Mice

Western harvest mice, house mouse (introduced), canyon mice, grasshopper mice and Great Basin pocket mice are found in the NCA. Western harvest and house mice were caught in riparian areas and along irrigation ditches; canyon mice were found in talus slopes, Great Basin pocket and grasshopper mice were widely distributed across the NCA (Montan 1977, p 27). These species are taken in small numbers by most diurnal raptors, but may be important in the diet of northern harriers and kestrels. Western harvest mice, house mice, and Great Basin pocket mice contributed almost 28% of the prey biomass delivered to western screech-owl nests in 1992 and about 34% of the prey biomass delivered to northern saw-whet owl nests from 1990-1993 (Rains 1998, pp 37-38). Marks and Doremus (1988, p 691) found that these species made up approximately 43% of the biomass delivered to northern saw-whet owls in 1986-87.

Wildlife Figure 2.7. The Number of Mice and Kangaroo Rats (K-rats) Observed from 1982-1994 on Spotlight Transects In and Near the NCA.



The above data is from Snake River Birds of Prey Research Project Annual Reports: Johnson *et al.* 1982 p.34 *; Johnson *et al.* 1983, p 27*; Johnson *et al.* 1984, p 18*; Doremus and Schroer 1985, p 151; Doremus *et al.* 1986, p 140; Doremus and Bolln, 1987 pp 115-118; Doremus and Blew 1988, p 94; Doremus *et al.* 1989, p 93; Knick 1990, p 59**; Knick 1991, p 158**; Knick 1992, p 268**; Knick 1993, p 237**; and Watts and Knick 1994, p 224**.
* Mice were not counted.
** Transect locations were added and run both spring and winter.

Other Rodents

Yellow-bellied marmots, desert and bushy-tailed woodrats, Townsend's and northern pocket gophers, vagrant shrew, least chipmunks, muskrats, porcupines, eastern fox squirrels, Norway rats, whitetail antelope ground squirrels, and beavers are found in the NCA. All but the beaver are taken as prey by raptors. Norway rats and fox squirrels are introduced species.

Waterfowl and Shorebirds

As stated earlier, riparian areas along the Snake River Canyon, including TWMA, Borden Lake, Halverson Lake, and C.J. Strike Reservoir provide habitat for a number of shorebirds and waterfowl.

There are one goose and 13 duck species that nest in the NCA. Two swan, four goose, and 26 duck species migrate through or winter in the NCA (Appendix 4).

The BLM and IDF&G share the management of the TWMA just north of Grandview, Idaho and Borden Lake, a marsh located immediately northwest of C.J. Strike Dam. Both sites are managed for waterfowl and upland game bird production. There are three ponds at the TWMA site that are fed by a waste water canal. The ponds were constructed by BLM and are maintained by the BLM, IDF&G, and Ducks Unlimited. An irrigated food plot of about 15 acres is found north of the TWMA. This plot is maintained by the IDF&G and Pheasants Forever and is planted with grain every 2-3 years. Shrub/grass cover around the ponds, reeds, rush, and cattails, and a few boxes and platforms in the ponds provide nest sites for several duck species. Many nest platforms are utilized by Canada goose each year.

Two black-necked stilts foraging in the Ted Trueblood Wildlife Management Area. This site is heavily utilized by migrant waterfowl especially in the spring.

Borden Lake marsh is a naturally enclosed basin where water from C.J. Strike Reservoir

seeps to the surface. By the late 1980's the area had become a closed marsh without open water, excluding waterfowl. The IDF&G opened up the marsh by digging a series of channels. The extracted material formed dikes along the channels. Because this activity lowered the water table, additional water was needed to keep the marsh plants alive. A siphon was built from the reservoir to the marsh. The siphon fails during high winds when waves on the reservoir allow air into the intake, losing the siphon effect. Use of the siphon was discontinued in the early 1990's. Borden Lake provides nesting for ducks and geese. Several nesting platforms are found along the dikes.

The IDF&G manages some public land within the boundary of the C.J. Strike Wildlife Management Area (WMA). Most notable are the Bruneau Duck Ponds. This is a series of ponds built by the IDF&G that run parallel to Highway 78 about ½ mile east of Highway 51 on the south side of the Snake River. These ponds are operated to provide waterfowl nesting habitat. There are several nest platforms in the ponds that are utilized by geese. Water pumped from the Snake River runs through a series of ponds before reaching those on public land.

All of these areas are open to public hunting, but are closed to the public during the waterfowl nesting season.

The IDF&G and BLM are working to control noxious weeds in all of the above areas. Purple loosestrife, perennial peppergrass, Canada thistle, and white top are of special concern. Several insects have been released to reduce purple loosestrife, with some success. No biological controls for perennial pepperweed, Canada thistle, and white top are available at this time so herbicides are used for their control. Herbicides are applied by hand to reduce the likelihood of them entering nearby water.

Upland Game

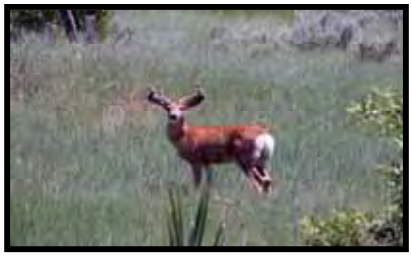
Pheasants, California quail, chukar, gray partridge, and mourning doves are found in the NCA. Pheasants and quail are usually found near irrigated agriculture and riparian areas. Gray partridge are found in uplands near irrigated or dry land agriculture. Pheasants and quail nest in the TWMA, Borden Lake, Bruneau Duck Pond areas and other riparian/marsh areas. They also utilize the food plot at the TWMA.

Chukar are found along the canyon and near volcanic buttes in areas with rocky escape terrain and cheatgrass (Ehrlich *et al.* 1988, p 266) and are not associated with agriculture.

Mourning dove nests are found from tree branches to the ground. Seeds, including waste grain, provide most of their diet.

Nuttall's cottontail rabbits are a common mammal and are covered under Key Raptor Prey Species (2.3.4)

Although the NCA historically supported sage grouse, the area has long been isolated from other sage grouse habitat by agricultural, commercial and residential developments, highways, utility corridors, areas that have burned, and areas that have been unsuccessfully rehabilitated. Also, perennial and intermittent streams that once flowed across the NCA have been captured by reservoirs outside of the NCA, and thus, except for the Snake River, there is little or no surface water in the NCA. In addition, the NCA supports levels of recreation, military, and other uses that would preclude re-establishment of sage grouse into the area, even if suitable habitat could be re-established. As such, there is little if any ex-



Mule Deer are found throughout the NCA, most often close to the Snake River and its tributaries and irrigated agriculture.

pectation that sage grouse could be returned to the NCA, and it has not been identified as a priority sage grouse management area.

Big Game

The loss of shrubs, native grasses, and forbs has greatly reduced habitat available for big game. Most of the NCA's ephemeral streams were captured by construction of the Indian Creek, Blacks Creek, and Mountain Home Reservoirs. As such, available range for big game, especially deer and pronghorn has been significantly reduced because of a lack of surface water. Many habitats are dominated by cheatgrass or burr buttercup and other invasive weedy species that lack the nutrition of native grasses and forbs. Also, food and water for big game are further reduced when agricultural land is subdivided or no longer irrigated.

There are over 100 resident mule deer in the NCA. During harsh winters mule deer numbers may double or triple. A small number are legally killed each year during hunting season.

White-tailed deer were introduced into the C.J. Strike WMA in the 1980's. They are found in the Bruneau River bottoms in and near the WMA.

Pronghorn are found throughout the NCA. Their distribution is limited by lack of water and poor condition rangeland. During the warm months pronghorn are found near irrigated agriculture, where there is water and green feed available. During the cold months they are found across the table lands, especially where preferred kochia is available as forage. Currently there are about 50 resident pronghorn in the NCA. During the winter 200-300 pronghorn may be found in the area.

Elk are rare winter visitors to the NCA. During harsh winter conditions a few elk may come into the NCA from the north and east. It is unlikely that a resident elk population would ever become established in the NCA.

Moose have only been sighted in the NCA twice in the last 30 years.

Mountain lion have been seen in and near the NCA. There are resident lions in the area. (Dick Orcutt pers. com.).

Non-game

Two-hundred and eighteen birds, 49 mammal, 14 reptile, 4 amphibian, 25 fish species (Appendix 4) and an unknown number of invertebrates, that are not hunted or listed as SSS, have been found. These animals are not listed as species of special concern because their populations are stable, there is no threat to their habitats, or so little is known about them or their habitat requirements that a special status designation cannot be made. These animals are no less important than the "listed" species. They have an integral part in creation of the soil and in plant and animal distribution and succession.

Fish

Aquatic habitat is home to 27 species of fish, including white sturgeon, the largest fresh water fish in North America. White sturgeon, redband trout and mountain whitefish are the only native game fish in the NCA, since the salmon and steelhead runs were blocked by downstream dams. Twelve species of exotic game fish have been introduced into the Snake River system. These include small-mouth bass, rainbow trout, perch, crappie and channel catfish. Carp, an exotic fish, may be the most common large fish in the Snake River. Eleven native fish are considered non-game fish including suckers, northern pikeminnow, dace, shiners and sculpin.

2.2.4 Geology

The NCA is located in the western Snake River Plain physiographic province, which is a northwest trending, fault bounded structural depression about 35 miles wide that extends from the Twin Falls area on the southeast to Hells Canyon on the northwest. The surface consists primarily of Quaternary basalt flows underlain by Tertiary fluvial and lacustrine sediments over 1,000 ft. thick. In the NCA, the Snake River has cut a deep canyon in the lake deposits. The basalts have repeatedly filled the canyon over the past 100,000 years and subse-

quently been eroded by the Snake River, forming a new canyon. The Snake River Canyon is the predominant surface feature in the NCA and provides important nesting habitat for the raptor populations that inhabit the area. Geological resources will not be affected by any of the RMP alternatives and as such, will not be discussed further.

2.2.5 Paleontology

Paleontological resources are the fossilized remains of organisms that illustrate the biologic history of the earth. Fossils are preserved in sedimentary rocks and even igneous rocks in a few unique situations. Fossils can be the remains of plants or animals, or can reflect their actions, such as tracksites. Some fossils are microscopic in size such as single-celled animals or pollen. Macroscopic fossils can include leaves, petrified wood, shells of invertebrate animals, bones, teeth, tracks, feeding traces, coprolites, and burrows.

Snake River Canyon wall showing the interbedded basalt and sandstone characteristic of the geology of the NCA.

Description and Summary

Fossilized remains of fish, amphibians, birds and land mammals are found at widely scattered sites. Invertebrate animal fossils such as mollusks and plant remains in the form of petrified wood also occur. The Miocene Chalk Hills Formation and the Mio-Pliocene Glenns Ferry Formation contain most of the fossils. These sedimentary formations are the result of deposition into and around the margins of a large lake, referred to by some researches as Lake Idaho, which existed in the western Snake River Plain for several million years. The thickness of the lake sediments in places exceeds five thousand ft. Fossils of land mammals and birds occur in these same formations in sediments that were deposited on the lake margins and in the channels and floodplains of streams that fed into the lake. The diversity of the fossil fish and mollusk fauna, the size of individual fossil specimens, and the nature of specializations in the fossil fish indicate that the Chalk Hills and Glenns Ferry Formations must have been deposited in a large, long-lived lake. Fossils have also been found in the Pleistocene Bruneau Formation which mantles the lake deposits over much of the NCA and is composed of numerous basalt flows and interbedded sediments.

Collection of fossils from public lands is allowed with some restrictions, depending on the significance of the fossils. Collection of significant fossils, which includes all vertebrate and any designated plant or invertebrate fossils, can only be done by qualified researchers under BLM permit; however, no permits are currently authorized. Since the collection of paleontological resources is adequately administered through existing regulations, and since no issues have been raised concerning the resources, the management thereof will not be further discussed in the RMP.

> Hobby collection of common invertebrate or plant fossils by the public is allowed in reasonable quantities using hand tools.
>
> The public is allowed to collect petrified wood without a permit for personal, non-commercial purposes. Collection of up to 25 pounds plus one piece per person per day, with a maximum of 250 pounds in one calendar year is allowed.

2.2.6 Special Status Species

2.2.6.1 Special Status Animals

"Special Status Animal Species" is a broad category that encompasses endangered, threatened, and proposed, candidate; Types 2, 3, and 4 sensitive; and watch list species. Type 2 species are range wide or globally imperiled, while Type 3 species are Regionally or State

imperiled. Type 4 species are peripheral to Idaho and include species that are generally rare in Idaho with the majority of their breeding range outside of the State. Currently the NCA has no proposed or Type 4 listed species. The NCA provides habitat for 43 special status animal species (Appendix 3).

In the NCA,
- 12% of the birds,
- 11% of the mammals,
- 22% of the reptiles,
- 57% of the amphibians, and
- 7% of the fish

are SSS (Appendix 3).

The BLM and IDF&G agree to "Ensure, to the best of their abilities, that critical habitats and populations of sensitive species occurring on lands administrated by the Bureau will be managed and/or conserved to minimize the need for listing these animals as threatened or endangered by either federal or State governments in the future" (USDI 2003).

Endangered Species

Idaho Springsnail

The Idaho springsnail, also known as the Homedale Creek springsnail, was listed as endangered on December 12, 1992 (Federal Register 1992). Although critical habitat for this species has not been designated, a recovery plan that included this snail was prepared in 1995 (USFWS 1995) and is still being used as a recovery guidance document. The Idaho springsnail was listed due to habitat fragmentation, river impoundment, water quality, and competition with the non-native New Zealand mudsnail (*Potamopyrgus antipodarum*; USFWS 1995). Critical habitat for the species has not been designated, and the current distribution of the species is in question.

The **Idaho springsnail** has been found in lake habitats where summer temperatures are believed to exceed 71.6º F.

Status and Distribution

The Idaho springsnail was historically found from Homedale (River Mile (RM) 416) to Bancroft Springs (RM 553) (USFWS 1995). This species has declined due to degradation of habitat (e.g., water quality), and habitat fragmentation due to river impoundments and associated habitat changes (USFWS 1995). The target recovery area includes the main stem of the Snake River between RM 518 and RM 553. With the exception of locations within the Bruneau arm of C.J. Strike Reservoir, this species is not known to occur outside of the main-stem of the Snake River.

Surveys conducted by Taylor in 1982 placed the distribution of this species from Bancroft Springs downstream to C.J. Strike Reservoir (RM 495). Taylor (1982) stated that it had vanished from river areas below C.J. Strike Reservoir. Dianne Cazier Shinn, a former Idaho Power Company biologist, reported finding the species throughout its historic range, as far downstream as Weiser (RM 338) (Shinn, 2002). Recent Idaho Power Company reports (Stephenson and Bean 2003) include density estimates for known colonies of this species upstream of Grandview, C.J. Strike Reservoir (two locations), and Weiser, with densities ranging from zero to 1,460 snails per square meter, from surveys conducted in spring, summer, and fall of 2002.

Life History

Very little is known about the life history of the Idaho springsnail. The species is primarily found in permanent, unimpounded waters of the main-stem Snake River, although live specimens have been collected from three locations within C.J. Strike Reservoir; one colony within the Bruneau arm of the reservoir contains the highest recorded densities of this species. Frest (2002) noted that although the

Idaho springsnail may occur in lake habitats, it requires moving water; this species is not known to persist in "slow water" habitats. This snail has not been found in other Snake River tributaries or in cold-water springs adjacent to the Snake River (Taylor 1982). The Idaho springsnail may spend some time as an interstitial dweller occurring on mud or sand with gravel-to-boulder size substrate, but may also be found on the surface of rocks and sometimes on aquatic macrophytes (Frest 2002). It often attaches to vegetation (pond weed) in riffles. There is currently no conclusive information on the depth distribution of this species in the Snake River profile. It is believed that, on average, the Idaho springsnail lives for about a year, with females laying eggs between February and May, but the number of eggs produced per female is not known. Juvenile snails appear in the population between March and July. Laboratory studies have shown that Idaho springsnail are active in water temperatures ranging from 48.5º to 92.7º F (Lysne 2003), but that snails died within one week if temperatures exceeded 87º F. The Idaho springsnail has been found in lake habitats where summer temperatures are believed to exceed 71.6º F. It is not known how such elevated temperatures or other eutrophic conditions might affect this snail's numbers, reproduction, or survival. Although their presence in warmer waters is noteworthy, this does not indicate that they can persist as viable populations under such conditions (Frest 2002). The Idaho springsnail has been described by most authors as being dependent on cold water of high quality (Taylor 1982, Frest *et al.* 1991). While this snail has been found, in one case in high densities, within C.J. Strike Reservoir, initial reports only record it from two (1.2%) of 168 sampled sites (Cazier 1997). The revised reports for these surveys do not provide sufficient detail to assess the abundance of the species within the C.J. Strike Reservoir. Additional information is needed to better understand the habitat requirements of this species.

Population Dynamics

There is a scarcity of information on the population dynamics of the Idaho springsnail. Idaho Power Company has provided some density estimates for some river colonies, but given the naturally patchy distribution and high variation in snail numbers, there are no good sample techniques established to provide confident estimates of population size or trends. In addition, there are no data to confirm the long-term persistence of known colonies. The colony at Bancroft Springs could not be detected over a 5-year period (1995-2000), but was recently re-detected (Shinn, Supplemental, 2002). Other colonies have also been detected both within C.J. Strike Reservoir and in the Snake River downstream of that dam, but long-term monitoring of those colonies has not been conducted. The species is declining due to deteriorating water quality and fragmentation of previously continuous habitats with free-flowing waters by dams (USFWS 1995). There is evidence that a non-native snail, the New Zealand mudsnail, may compete with or otherwise negatively impact the Idaho springsnail. The mudsnail has rapidly expanded its distribution throughout the Snake River and shows a wide range of tolerance for water fluctuation, velocity, temperature, and turbidity. It competes directly for habitat with the Idaho springsnail (USFWS 1995). The mudsnail reproduces asexually, giving it a reproductive advantage over the Idaho springsnail, which reproduces sexually. To date, no population viability studies have been conducted for the Idaho springsnail.

Threatened

Bald Eagle

The adult bald eagle is easily identified, as it is a large bodied, wide winged bird with white head and tail and a dark brown body. The beak, legs, and feet are yellow. It takes the birds 5-6 years to acquire adult plumage. The younger birds range in dark brown juveniles to mottled whitish and dark plumage in the subadults. Their large beaks give their heads an elongated appearance and their wings appear wider than that of juvenile golden eagles. Adult eagles weigh from 4.4 – 13.6 pounds

Bald Eagle was declared endangered in 1978 and was upgraded to threatened in 1995.

(lbs), average 9.5 lb.; males averaged 9 lbs. and females 11.6 lbs. (Johnsgard 1990 p144). Wingspan average is 6.5ft., and body length 2.5 ft. (Sibley 2000 p 127).

Status and Distribution

The bald eagle was declared endangered under the Endangered Species Act (ESA) in 1978, and upgraded to threatened in 1995. Initial threats for the species being listed were related to the pesticide DDT and the subsequent effects it had on various avian species. Since the ban on DDT and protection under the ESA, the bald eagle is breeding in more States and the bald eagle population has been increasing in much of North America.

The bald eagle occurs throughout most of Canada and the U.S., nesting mostly in the northern parts of its range (Buehler 2000, p 3). In Idaho, the eagle is found in 22 of 25 lati-long blocks during the breeding season and in 24 of 25 lati-long blocks during the winter (Stephens and Sturts 1998). Breeding eagles are concentrated in northern and eastern Idaho (Sallabanks 2002 pp 2-4). There are no known bald eagle nest sites along the Snake River/C.J. Strike Reservoir area. There were two active nest sites at Lake Lowell in the Deer Flat Wildlife Refuge south of Nampa, Idaho (Sallabanks 2002, p 3). Lake Lowell is approximately 5 miles from the Snake River. Bald eagles are commonly seen all along the Snake River in the winter, and concentrate at locations like Lake Lowell and C.J. Strike Reservoir where there are large numbers of wintering waterfowl. There is a winter roost along the Bruneau River, northwest of Bruneau Idaho, in the C.J. Strike Wildlife Management Area (J. Doremus pers. obs.). The roost is in large old open cottonwoods.

Most bald eagles are observed along C.J. Strike Reservoir between Loveridge Bridge and Grandview. In addition to food, perching and roosting trees are important resources needed by bald eagles. The number of bald eagles observed during January midwinter bald eagle surveys has ranged from 11 to 37. During years of high jackrabbit numbers, they are seen hunting from utility poles over suitable habitat on the desert plateau above the Snake River.

- In Idaho, it is likely that eagles arrive at their nest sites following spring thaw.
- Nest sites can be used by generations of eagles.
- Wintering eagles need relatively undisturbed perching and roosting trees near a food source.
- They prefer large trees for perching and roosting.
- They eat fish and to a lesser degree, mammals and birds.
- They commonly scavenge and also benefit from livestock carcasses.
- They are one of the few animals that can open a carcass, allowing other scavengers to feed.

Life History

One to four eggs are laid at intervals of 2-4 days, and incubation lasts for 34-38 days. Both the male and female incubate. The young weigh about 100 grams at hatching, and fledge in 10-12 weeks after hatching. They depend on their parents for food and protection for another 4-12 weeks. Movement of the young away from the natal area may depend on food supply, adult harassment, harassment from other species, and weather. The young go through several molts before obtaining adult plumage at five years of age. They may start breeding while in juvenile/sub-adult plumage. Eagles move to open water when winter freeze

begins, though groups of eagles may stay at iced over sites if there is a sufficient food supply. Breeding activity occurs from October to May depending on latitude.

Population Dynamics

The bald eagle population has increased throughout most of the U.S. south of Canada. The ban on DDT, protection of nest sites, hacking young into areas vacated in the 1950's and 60's, and cleaner water all have helped to return the eagles to vacated and new breeding areas. Breeding eagles in the southern portion of their range are not fairing as well, as human populations make more demands on their environment. The number of both breeding and wintering eagles has increased in Idaho since the 1960's.

Candidate Species

Yellow-billed Cuckoo

The U.S. Fish and Wildlife Service (USFWS) received a petition on February 2, 1998 to list the yellow-billed cuckoo as an endangered species. On October 30, 2001 the USFWS chose not to list the species.

The range and population of the cuckoo have been substantially reduced across the western U.S. in the last 50 years. Historically, yellow-billed cuckoo have been found scattered in drainages in arid and semi-arid portions of Idaho. Yellow-billed cuckoos have only been observed recently on a few of the islands in the Snake River with tree overstory and shrub understory. A 2004 survey for the species in Idaho (USDI 2005b) found the cuckoo as a rare migrant and summer resident. There are no documented nests in southwestern Idaho. Several sites in the NCA may be suitable for development of yellow-billed cuckoo habitat (USDI 2005b, p 4). Breeding has been confirmed on the South Fork of the Snake River in lati-long 22 and in lati-long 26 in Minidoka County and breeding has been suspected in 6 other lati-longs (Stephens and Sturts 1998, p 36). The preferred habitat of the cuckoo is riparian woodlands that include cottonwood and willow. Their nesting home range may include 25 acres (10 hectares) or more of riparian woodland habitat. (USFWS 2002, p 2, yellow-billed cuckoo guidelines).

The yellow-billed cuckoo is considered a rare, sometimes erratic visitor and breeder in the Snake River Valley of southwestern Idaho. They have been heard on islands in and near the NCA.

Type 2 Rangewide/Globally Imperiled Species

Pygmy Rabbit

The pygmy rabbit is a sagebrush obligate that has been found from 2900 ft. to over 6000 ft. in elevation in southwestern Idaho. The pygmy rabbit is being considered for Threatened and Endangered (T&E) listing because of destruction and fragmentation of sagebrush habitat in the western U.S. This rabbit utilizes sagebrush year round for shelter and food.

In the NCA between 1984 and 1994, pygmy rabbits were found during spotlight transects in old (100 years +), dense big sagebrush stands around Initial Point (Doremus and Bolln 1987, p 119; Doremus and Blew 1988, p 96; Doremus *et al.* 1989, p 93; Knick 1990, p 59; Knick 1991, p 158; Knick 1992, p 268; Knick 1993, p 237; Watts and Knick 1994, p 224). This habitat burned in 1996 during the Point fire and has not recovered. One sighting of a pygmy rabbit was made during spotlight transects in the northeastern corner of the OTA. This habitat is still intact, but repeated searches, both during the day and by spotlight for the rabbits, have been unsuccessful. All remaining large patches of big sagebrush have been searched in recent years either on foot or by spotlight, with no sign of pygmy rabbits.

It is likely that **pygmy rabbits** no longer inhabit the NCA.

Greater Sage Grouse

The greater sage grouse is found in Washington, Oregon, California, Nevada, Arizona, New Mexico Colorado, Wyoming, Montana, and Idaho (Sibley 2000, p 148). This region is spatially and temporally dynamic. In a discussion of the impacts of spatial and temporal habitat changes on sage grouse, Miller and Eddleman (2001, p 1) state:

> "During the past 130 years, significant changes in disturbance regimes have affected their habitat. Plant communities in existence today are unique from any other time period because of altered disturbance regimes, confounded by a continual change in climate. In some portions of their range, sage grouse populations have been reduced or eliminated from loss of habitat through land conversion to agriculture or shifts from perennial shrub grasslands to introduced exotic annual grasslands or pinyon-juniper woodlands. Spatial and temporal diversity significantly affect the quality of sage grouse habitat. Because of the diversity, of biotic and abiotic factors and land use history across the range of sage grouse; plant community structure and composition have responded differently throughout this region."

The NCA is an excellent example of "significant changes in disturbance regimes". Sagebrush stands are cut off from other sage grouse habitat by agricultural, commercial, and urban development, rural subdivisions, highways, utility corridors, off highway vehicle areas, areas that have burned, and areas that have been "rehabilitated". Also, perennial and intermittent streams that once flowed across the NCA are now captured by the Mountain Home, Indian Creek and Blacks Creek Reservoirs, and as such, except for the Snake River, surface water rarely flows across the NCA. In addition to the above, the NCA supports levels of recreation, military, and other uses that would preclude the viable re-establishment of sage grouse populations, even if suitable habitat were available.

Only one sagebrush stand between Fossil and Sinker Creeks is connected across native shrub stands to occupied sage grouse habitat. Much of the connecting shrub stands are salt desert shrubs, not sagebrush. As late as the 1940's there were active sage grouse leks near Cinder Cone Butte, in the north central portion of the NCA. At that time, there were continuous sagebrush stands from south of Cinder Cone Butte north across the foothills to the Danskin Mountains and Bennett Hills. Even into the 1950's people would successfully hunt sage grouse along Highway 30, between Boise and Mountain Home, Idaho (James Johansen, pers. com.). The closest known active sage grouse lek south of the Snake River is at the headwaters of West Rabbit Creek (T-2-S, R-2-W, section 31) [Mike Mathis pers. com.] about six miles southwest of Murphy, Idaho. The closest lek north of the Snake River is about one mile north of Blair Trail Reservoir (T-4-S, R-10-E, section 18) [Tim Carrigan pers. com] about eight miles north of Glenns Ferry, Idaho and 11 miles east of the NCA boundary.

There are no known **sage grouse leks** in the NCA.

American White Pelican

American white pelicans are found along the Snake River from Brownlee Reservoir to Blackfoot Reservoir, and on other lakes and reservoirs like Lake Lowell, and along tributaries of the Snake River like the Payette and Boise Rivers (Stephens and Sturts 1998, p 9 and Trost and Gerstell 1994, Table 4). In 1993, Trost and Gerstell (1994, p 22) found pelicans nesting at Minidoka National Wildlife Refuge, Blackfoot Reservoir, and Three Islands State Park near Glenns Ferry, Idaho. Breeding age birds are seen every spring and

summer but there are no known nesting colonies along the Snake River below Three Island State Park. As many as 360 pelicans have been seen at one time on the TWMA ponds and the adjacent Snake River (J. Doremus pers. obs. 18 July 2001). Even though hundreds of pelicans use the Snake River and nearby open water, it is unlikely that they will be able to establish a breeding colony, as there are no sites isolated enough from human disturbance and mammalian predation to provide suitable nesting habitat.

The American white pelican is abundant during the summer along the Snake River, C.J. Strike Reservoir, and the ponds at the Ted Trueblood Wildlife Management Area.

Northern Leopard Frog

The northern leopard frog is the most widespread amphibian in North America. It is found from desert lowlands to the high mountains (Stebbins 1966, p 76). Northern leopard frogs are found along the Snake River in Idaho, and have been widely introduced into the western States (Thomas, A. 2001, p 8). Their preferred habitat is swampy cattail marshes at lower elevations and beaver ponds at higher elevations. Leopard frogs have been greatly reduced or eliminated over much of their range (Thomas, A 2001, p 5). Munger, *et al* (1993, p 4) searched for amphibians around Mountain Home and the foothills to the east, and did not find any leopard frogs. Causes of this decrease are not known. Predation by the introduced bullfrog, exposure to toxic materials, collection for biological specimens, reduction in wetlands, poor quality wetland and riparian habitat, and climate change may combine to affect leopard frog abundance.

White Sturgeon

The largest remaining population, of white sturgeon is in the Columbia River Basin (Miller *et al.* 2004, p 1). At least a portion of the white sturgeon population in the Columbia River drainage went to sea before they were blocked by dams. The Columbia River Basin populations have been isolated behind 26 major dams and reservoirs. In the Snake River system, there are 12 dams between the Snake River mouth and Shoshone Falls (Miller *et al.* 2004, p 4), the upstream limit of their range. The white sturgeon population above Brownlee Dam is isolated from those populations downstream in the Snake and Columbia Rivers. Impoundments reduce the amount of free flowing water, isolate populations, reduce spawning areas, and influence water temperature, dissolved oxygen, and annual discharge patterns. Irrigation dewatering appears to limit sturgeon spawning. Sturgeon poaching to collect their eggs for the caviar market has become an important factor in our efforts to sustain fish populations.

Redband Trout

Most redband trout populations are in isolated stream systems in the Columbia River Basin. (Stream Net 2001, p 1). It is not clear if any redband trout exist in the main stem Snake River and its connected tributaries or if these fish are hybrids with rainbow trout introduced from west coast populations. It may be that behavior or time of spawning keep the two sub-species isolated. Redband trout may be in the lower reach of Sinker Creek. Much of Sinker Creek's water is diverted for irrigation upstream of the NCA.

Type 3 Regional/State Imperiled Species
Spotted Bat

Spotted bats are found in various habitats from desert to montane coniferous forests (Groves *et al.* 1997). They are known from the southwestern corner of Idaho including the NCA. Spotted bats have been heard or captured a few times and it is likely that they breed in the cliffs along the Snake River. The Snake River Canyon with its fissured cliffs and open water should be ideal habitat for them. There is some evidence that the bats eat moths, perhaps exclusively.

Trumpeter Swan

The Trumpeter Swan is an annual migrant in the NCA, but is not known to breed in southwestern Idaho. They are seen on the Snake River, C.J. Strike Reservoir, and the TWMA during migration and sometimes winter in the area. Wintering trumpeter swan were captured

in eastern Idaho and released in the NCA and other locations in the early 1990's in attempt to expand their winter range (Baskin 1993, p 76.).

Peregrine Falcon

This falcon was an endangered species in the U.S. until 1999 (Grossman and Hamlet 1964, p 394; and Hoffman 1998, p 20). Peregrine falcons are worldwide in distribution but are uncommon to rare migrants through the NCA. There are records of a pair possibly nesting at the confluence of the Snake and Bruneau Rivers in the 1940's (Nelson 1975, p 191). It is possible that the inundation of the marsh on the Bruneau Arm by C.J. Strike Reservoir covered the hunting area for the falcons. Prairie falcon densities and lack of prey have apparently kept peregrines from nesting in the NCA since the 1950s (USDI 1995b). Attempts to reintroduce peregrines by cross-fostering young peregrines in nests of prairie falcons in the NCA from 1977 to 1979 were abandoned when the Peregrine Fund decided it was not a successful technique

Prairie Falcon

See Fish and Wildlife Section 2.2.3.

Northern Goshawk

It has been petitioned for classification as an endangered species, but has not been listed. See previous discussion.

Ferruginous Hawk

See Fish and Wildlife Section 2.2.3.

Black Tern

Black terns are spring/fall migrants in the NCA and nest in deep emergent vegetation. The nearest nesting colony may be at Indian Hay Meadow on the eastern edge of the Duck Valley Indian Reservation, or in the marshes near the Owyhee River at Duck Valley. They feed mostly on insects and small fish caught over or in marsh and open water.

Calliope Hummingbird

The calliope hummingbird breeds in open montane forests, mountain meadows, and willow and alder thickets (Sibley 2000, p 300; Ehrlich *et al.* 1988, p 332). They feed on nectar, insects and tree sap and winter in Mexico (Ehrlich *et al.* 1988, p 300). The most difficult time for hummingbirds in southwestern Idaho is during the fall migration. During drought years, few flowers are available where the birds can feed on nectar or small insects. The Calliope Hummingbird is not known to nest in the NCA but probably migrates through the area.

Lewis' Woodpecker

Lewis' woodpeckers breed over much of Idaho (Stephens and Sturts 1998, p 41), and nest in open woodland and forest, including riparian woodland. These woodpeckers have not been found nesting in the NCA, and are rarely seen during migration.

Willow Flycatcher

Willow flycatchers are insect eaters, and usually nest in willow trees in swamps and thickets. Willow flycatchers have been heard during the breeding season at the mouth of the Bruneau River, the Bruneau Duck Ponds, and Gold Isle in the NCA (J. Doremus pers. obs.).

Olive-sided Flycatcher

Olive-sided flycatchers breed throughout most of Idaho (Stephens and Sturts 1998, p 44), but are migrants through the NCA.

Loggerhead Shrike

Over much of their range, loggerhead shrikes are becoming scarce or absent. They breed across southern Idaho and winter in small numbers in Southwestern Idaho (Stephens and Sturts 1998, p 47). The number of breeding shrikes in southern Idaho has been reduced by the loss of shrubs. Although loggerhead shrikes have suffered a serious decline throughout their breeding range over the last 50 years (Sauer *et al.* 2001), Woods (1994 p176) found them in higher densities and more productive where shrub/grass habitats were

still intact in Southwestern Idaho. These shrikes were common nesting birds in the NCA until large blocks of big sagebrush were burned outright or fragmented in the 1980's and 1990's (J. Doremus pers. obs.).

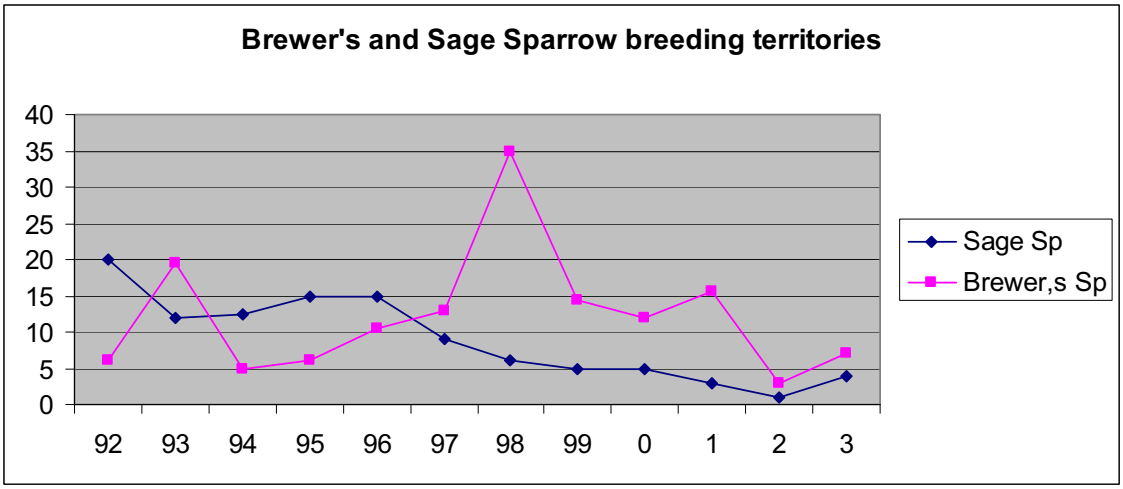
Sage Sparrow

Breeding Bird Survey data from throughout the West indicate declining sage sparrow populations. Sage sparrows are shrub-obligates, breeding almost exclusively in sagebrush (especially big sagebrush), or sagebrush mixed with other shrubs (Braun *et al.* 1976, p 166). Knick and Rottenberry (1996, p 8) considered sage sparrows to be the most habitat specific of NCA passerines and predicted that they would be adversely affected by the current direction of habitat changes in the NCA. Surveys done at 119 sites from 1992 to 1995 found sage sparrows at only 36 sites (Knick and Rottenberry 1999, p 107). Not all necessary habitat features have been identified, as they are often absent from areas where the habitat otherwise appears suitable.

Brewer's Sparrow

Brewer's sparrows nest in arid brush-lands at lower elevations and in thickets at higher altitudes and latitudes (Ehrlich *et al.* 1988, p 588). In the NCA, they are common nesting sparrows in big sagebrush stands. However, their breeding population has suffered from the loss of shrubs and fragmentation of shrub stands. These sparrows prefer an abundance of shrub cover, and within a given habitat patch, the probability of their occurrence increases with increases in total shrub cover. Knick and Rotenberry (1996, p 7) found Brewer's sparrows at 83 of 119 sites studied from 1992 to 1995. Breeding Bird Surveys indicate a significant 5.1%/year decline in Brewer's sparrow in Idaho (Sauer *et al.* 2001), but Schoeberl (2003, p 25) considered it as common on his study area in southwestern Idaho near the NCA. Doremus (unpublished data) observed rapid fluctuations in the number of Brewer's sparrow breeding territories from 1992 to 2003 in a 60 acre site in an old big sagebrush stand (see Wildlife Figure 2.8 below).

Wildlife Figure 2.8. Brewer's and Sage Sparrow Breeding Territories in Old Big Sagebrush Stand in the NCA, 1992 to 2003.



Great Basin Collared Lizard

The Great Basin collared lizard, also referred to as the Mojave black-collared lizard, is found throughout much of the southwest and intermountain west (Pope and Munger 2003, p 2). In Idaho, they are limited to the western Snake River Valley (Groves 1989, p 5), which is at the northern end of their range. They are an uncommon lizard that prefers areas with large boulders and open shrubs. The popula-

tion suffers from cheatgrass invasion, which makes movement across open areas more difficult.

Longnose Snake

In Idaho, the longnose snake is limited to the lower Snake River Valley (Groves 1989, p 9). It is found in deserts, prairies and brush-land (Stebbins 1966, p 162), and is most abundant in areas of loose soils through which it can burrow. It has also been seen in tall grassy areas like the TWMA (J. Doremus pers. obs.). The snake was a very common red-tailed hawk prey item in the lower canyon of Sinker Creek on the Montini/Nahas ranch in the 1980s. The habitat at the ranch consists of large blocks of talus, sandy soil, and irrigated pasture.

Western Ground Snake

The western ground snake is the smallest snake in the NCA and is found in Idaho in the Lower Snake River Valley (Groves 1989, p 9) in arid and semi-arid habitat, especially near talus. It is usually associated with loose soil.

Common Garter Snake

The common garter snake is found over most of Idaho (Groves 1989, p 9), but is declining over much of its range. It is usually found near water and swims readily. It is not known if the common garter snake exists in the NCA. Four years of snake trapping between 1975 and 1978 did not capture any common garter snakes (Diller and Johnson 1982, p 27).

Western Toad

The western toad is found across Idaho (Groves 1989, p.5). They are found in desert streams and springs, sagebrush, grasslands, woodlands, mountain meadows and irrigated agriculture. They may be found away from water. No western toads were caught in drift fence traps during a four year study in the NCA.

Woodhouse's Toad

The Woodhouse's toad (western sub-species) are found in sagebrush deserts, grasslands, desert streams, woods, valleys, floodplains, farms, and city backyards (Stebbins 1966, p 61). Thirty-three Woodhouse's toads were caught in drift fence traps during a four year study in the NCA; twenty-two in riparian habitat and 11 in talus slopes (Diller and Johnson 1982, p 103).

Watch List

These are animals that are of concern because of loss of habitat or downward trend in populations somewhere in their range.

Yuma Myotis, Western Small-footed Myotis, and Western Pipistrelle

All are found in desert or shrub land habitat. The western pipistrelle and western small-footed myotis both utilize caves and rock crevices. The Idaho range of all these species includes the NCA (Bert and Grossenheider 1959, pp 17 and 23).

Barrow's Goldeneye

In Idaho, Barrow's goldeneye are found on the Snake River from Idaho Falls to Lewiston during the winter (Stephens and Sturts 1998, p17). They are uncommon on the Snake River in the NCA.

Swainson's Hawk

The Swainson's hawk is a common nesting species in some farmlands near the NCA in southwestern Idaho, but is less common in the NCA, probably because of the scarcity of trees it requires for nesting. Nesting of Swainson's hawks in the NCA depends strongly upon the availability of suitable nesting trees; fires, cattle grazing, and loss of water supplies are threats to the continued availability of suitable trees (Bechard 2003).

Burrowing Owl

In the NCA, burrowing owls prefer open grassland habitat, and nest in burrows dug most often by badgers. They feed on insects, small mammals, birds, and reptiles. Burrowing owl populations have declined over much of their North American range (Klute *et al.* 2003, p 13), but populations in and near the NCA

appear to have increased following widespread wildfires in the 1980s (Steenhof *et al.* 2000, p 100).

Short-eared Owl

The short-eared owl is an opportunistic hunter, taking whatever small mammals and birds are most available. This is a species in serious decline over much of its range, but particularly in the northeastern U.S. (Holt and Leasure 1993, p15). Breeding Bird Survey data show a statistically significant 3.5% per year decline from 1966 to 2001 across the overall range and an even steeper decline of 11.4% per year in Canada. In areas of southern Idaho, the Breeding Bird Survey shows significant declines (Holt and Leasure 1993, p15). Short-eared owls winter in the southwestern Idaho (Stephens and Sturts 1998, p 39), and are uncommon to rare breeders in the NCA. However, every 10-15 years, when the NCA receives higher than average winter/spring moisture, making grass cover abundant, the owls may become common to abundant breeders. In the NCA, short-eared owls nest mainly in grassland areas (Lehman *et al.* 1996b, p 6), and several pairs often nest close together in clusters (Lehman *et al.* 1998, p 252). Short-eared owls are known to be nomadic in search of adequate prey populations (Holt and Leasure 1993, p 3), and that characteristic may partially explain why the total number of pairs that nest in the NCA varies greatly from year to year. Densities may change by three-fold from one year to the next (Lehman *et al.* 1998, p 250). It is unlikely, however, that voles play a major role in short-eared owl densities away from agriculture or riparian areas. Density of vegetation is more likely the key to their nesting in upland areas.

Red-naped Sapsucker, Green-tailed Towhee, and Cordilleran Flycatcher

Red-naped sapsuckers, green-tailed towhees, and cordilleran flycatchers migrate through the NCA. All of these birds nest in Idaho at elevations higher than the NCA. They are all birds of the west, (Sibley 2002, pp 311, 324, and 475).

Wilson's phalarope

Wilson's phalarope is a small shore bird that utilizes ponds, lakes and reservoirs for feeding and nesting. It nests in the NCA and many migrate through the area each year.

Long-billed Curlew

The long-billed curlew is a shore-bird that nests in arid habitat at times well away from open water. They were heavily hunted for personal food and money. They prefer grasslands for nesting and have increased in numbers in the NCA as shrub habitat has burned. Partners-in-Flight has identified the long-billed curlew as a bird of the highest continental concern (Pashley and Rich 2004).

Sage Thrasher

The sage thrasher population has been greatly reduced by the loss or fragmentation of sagebrush stands. They depend almost entirely on sagebrush habitat during the breeding season, but are occasionally seen in other shrub-steppe areas, such as greasewood and bitterbrush. Shrub size is very important for nesting, with the birds requiring sagebrush approximately one meter in height. Sage thrashers are not as sensitive as some shrub-steppe bird species to the effects of overgrazing and other types of habitat degradation (Reynolds and Rich 1978, p 580). Sage thrashers require large sagebrush.

Grasshopper Sparrow

The grasshopper sparrow is found across southern Idaho and onto the Columbia Plateau and northern Great Basin (Sibley 2000, p 486). In Idaho, it is found in the north, western, and southern third of the State (Stephens and Sturts 1998, p 64). It has been found in the eastern portion of the NCA during the breeding season.

Brewer's Blackbird

The Brewer's blackbird is a year-round resident in the NCA, and nests in shrubs, grass, riparian woodlands, shrubby areas, around habitations, and emergent vegetation (Ehrlich et al, 1988, p 614).

Cassin's Finch

In Idaho, Cassin's finches nest nearly statewide and winter along the western and southern borders (Stephens and Sturts 1998, p 69). Cassin's finches nest in open conifers at higher elevations (Ehrlich *et al.* 1988, p 644). They are a migrant through the NCA.

Night Snake

Desert night snakes are found in southwestern and south-central Idaho (Groves 1989, p 9). It is one of the most common snakes in the NCA (Diller and Johnson 1982, p 1). The highest densities of night snakes were found near canyon rims and talus; however, about 30% of all night snakes were captured in shadscale/greasewood habitat (Diller and Johnson 1982, p 26).

2.2.6.2 Special Status Plants (SSP)

The BLM maintains a list of plants identified as Special Status Plant (SSP) consideration because of threats to the species. Species on the list are given a numeric ranking (from 1 to 5) based on a number of criteria including risk of extinction and population size, distribution, and trend. Species with the greatest threat are assigned a ranking of 1 and those with the least threat are assigned a ranking of 5:

- **Type 1** – Federally listed species (Threatened, Endangered, Proposed, Candidate),
- **Type 2** – Rangewide/Globally Imperiled Species – High Endangerment,
- **Type 3** – Rangewide/Globally Imperiled Species – Moderate Endangerment,
- **Type 4** – Species of Concern, and
- **Type 5** – Watch Species (Species monitored to determine if removal from the list and/or elevation in status is warranted).

Current Status

Sixteen SSP species (Appendix 8 – Vegetation Table 3) are known to occur in the NCA including:

▫Type 1 = 1 ▫Type 2 = 4 ▫Type 3 = 6
▫Type 4 = 4 ▫Type 5 = 1

An additional two species, shining flat sedge and Janish's penstemon, do not occur in the Idaho Conservation Data Center (ICDC) database, but either probably occurs in the NCA or was known to occur there historically.

Because these species occur in a variety of soil types representing many ecological sites, they are distributed throughout much of the NCA (Special Status Plant Maps 1 and 2).

Limited inventory and monitoring data are available for many SSP occurring in the NCA; however, distribution maps and population status are updated regularly as new information becomes available (Special Status Plant Maps 1 and 2). In general, BLM conducts two basic types of inventories for SSP:

1. Project-specific inventories, which assess the effects of BLM actions on any SSP that might be present in a project area as required under the NEPA; and
2. Species-directed inventories to better determine the endangerment status of particular SSP. Species-directed inventories have focused on Davis peppergrass and slickspot peppergrass. These species also receive additional management consideration.

Slickspot Peppergrass

In July of 2002, slickspot peppergrass was proposed for listing as endangered under the ESA. In lieu of listing, the BLM Idaho State Office, Idaho Office of Species Conservation, Idaho Department of Lands (IDL), IDF&G, IDARNG, and several non-governmental cooperators (local ranchers) entered into a Candidate Conservation Agreement (CCA) for slickspot peppergrass that describes a specific set of management actions designed to slow or prevent the decline of this species. The CCA established guidelines and set policy for management of slickspot peppergrass throughout its range in southwestern Idaho, including the designation of 12 management areas that were set aside specifically for the management and protection of the species. Five of the management areas occur partly or wholly within the

boundaries of the NCA (Special Status Plant Map 2). The CCA established two sets of management actions, one set to be applied throughout the range of the species, and another set that was specific to each of the 12 management areas. These management actions focus on what is believed to represent the most serious threats to the species; loss of habitat from fire, loss of habitat associated with fire suppression activities, loss of habitat from weed invasion, loss of habitat from off highway motorized vehicles, loss of habitat from the negative effects of military training and related activities, and the loss or degradation of habitat from livestock grazing.

For the past few years BLM and ICDC have monitored the population status of slickspot peppergrass using a standardized sampling protocol (Habitat Integrity Protocol), which was updated and incorporated into the CCA. There are currently 70 known elements of occurrences (EO) for slickspot peppergrass. Monitoring transects were established in several of these EO in the past. The CCA requires that monitoring transects be established in all of the existing EO and that each of these transects be monitored on an annual basis or as available funding dictates.

Slickspot peppergrass is managed under a 2003 Conservation Agreement. There are currently 70 known elements of **occurrence.**

On January 22, 2004, USFWS published a Federal Register notice withdrawing their proposed rule to list slickspot peppergrass as endangered. The withdrawal of the proposed rule was based on their conclusion that there was a lack of strong evidence of a negative population trend, and the conservation efforts contained in formalized plans (the CCA, and the Integrated Natural Resource Management Plans for the Orchard Training Area and the Mountain Home Air Force Base) had sufficient certainty that they would be implemented and would be effective in reducing the risk to the species to a level below the statutory definition of endangered or threatened.

Following their withdrawal of the proposed rule, USFWS was sued for failure to list slickspot peppergrass as endangered. In response to this litigation, USFWS agreed to collect additional information, reassess the status of the species, and to issue another listing decision in August 2006. As such, slickspot peppergrass is again considered a proposed species until USFWS determines whether additional evidence warrants listing as threatened or endangered. Until the decision is issued, slickspot peppergrass will continue to be managed under the policies and guidelines established in the CCA, and any agreed-upon amendments thereto.

Davis Peppergrass

Davis peppergrass has been monitored since 1987. Monitoring efforts occur jointly between BLM and IDARNG. Permanent transects have been established at several locations within the NCA and monitoring results for 2004 indicated a downward trend in the population. The major factor contributing to population decline is believed to be habitat loss resulting from weed invasion, most notably cheatgrass and Russian thistle.

2.2.7 Soil

Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management (S&Gs), address the need for maintaining and promoting soil stability, watershed health, and biotic integrity by having adequate amounts and types of ground cover to support infiltration, maintain soil moisture storage and transfer, and stabilize soils. There is also a need to provide for proper nutrient and energy cycling that promotes and sustains site productivity. Watershed health is the degree to which the integrity of the soil, vegetation, water, and

air, as well as the ecological and hydrological processes of the ecosystem, is balanced and sustained.

Livestock grazing (both current and historic), fire regimes, military activity, and OHV activity are major agents affecting soil stability, productivity, and watershed health.

Description and Summary

Soil profile characteristics have been influenced by wind-deposited materials high in carbonates and can be described as follows:

- Various forms of cementation (duripans) are common at differing depths in the soil profiles.
- Soils are shallow to very deep and well drained to excessively drained.
- Surface soil textures range from loams and silt loams to sandy loams.
- Sub-soils can vary from sandy loam to clay loam.
- The soils have an aridic or aridic/xeric soil moisture regime and a mesic soil temperature regime.
- The wind and/or water erosion potential ranges from low to high depending on surface texture and slope (Soil Map 1).

Soils information for the NCA was obtained from the National Resource Conservation Service (NRCS) soil surveys for Owyhee County (2003), Ada County (1980), Canyon County (1972), and Elmore County (1991).

- Soils in the NCA are somewhat diverse, as a result of variability in parent materials, climate and vegetative communities.
- Soils occur on nearly level to strongly sloping basalt plains and alluvial terraces, and were formed in alluvium and residuum derived from sedimentary materials and basalt.

An important component of many ecological sites in the NCA is the biological soil crusts, which play a particularly important role by protecting the interspatial areas from various forms of erosion. Occupying the interspatial area between larger plants, these crusts enhance soil stability, soil moisture retention, and site fertility (by fixing atmospheric nitrogen and contributing organic matter). The crusts also appear to limit germination and establishment of invasive annual grasses.

Crust cover can often be inversely related to the amount of bare ground, suggesting that a decline in crust cover produces an increase in bare ground (rather than an increase in vascular plants, with the exception of invasive annuals). In the NRCS "National Range and Pasture Book", biological soil crusts are identified as a critical ecological attribute to be used as an indicator of rangeland health (USDA 2003). These crusts may serve as an early indicator of ecological site decline since they appear to be more sensitive to disturbance from livestock and OHV activity than vascular plants. In the NCA, biological soil crusts are in a severely depleted condition.

Conditions and Trends

In areas of the NCA where historic livestock grazing has degraded the watershed, an early- to mid-seral or disturbed vegetative condition now exists. This trend is continuing throughout the NCA, and in combination with wildland fire, native vegetation is being altered and replaced by less desirable species, or in the worst case, exotic invasive and noxious species.

Only four out of the last 11 years (1993, 1995, 1996, and 1998) received average or slightly above average annual precipitation.

- The NCA is characterized by cool, moist winters and hot, dry summers.
- Average annual precipitation in the NCA ranged from 6.8 to 10 inches from 1992 to 2002.
- During drought, annual precipitation has been as little as 3 inches at some locations.

Areas in a degraded ecological condition are subject to increased erosion processes and impaired watershed health. As vegetative cover is

depleted and species composition is changed, site productivity is reduced through erosion and lack of biological diversity (Blackburn *et al.* 1986, p 31-38). Continuation of this trend could lead to desertification in some areas. This phenomenon is already apparent in large areas where drought, in combination with historic grazing practices and wildland fire, has exposed soils to accelerated rates of wind erosion. Due to depleted surface soil, these areas are transitioning to a vegetative community dominated by weedy annual forbs.

Also affecting watershed health is the amount of mechanical disturbance to the soil surface resulting in compaction and structural breakdown. Soil disturbance has been shown to reduce vegetative composition, vigor, and productivity. Several studies on grazing intensity consider heavy livestock trampling to be more harmful to the watershed than excessive grazing (Warren *et al.* 1986a, pp 500-504, Warren *et al.* 1986b, pp 491-495).

2.2.8 Upland Vegetation

Introduction

Prior to European settlement, the NCA was dominated by three principal vegetation communities: Wyoming big sagebrush, winterfat, and shadscale, each with an understory of perennial grasses and forbs. These communities were often found as complexes or mosaics. Biological soil crusts, consisting of lichens, algae, and mosses, are another important component of the ecological community (Yensen 1982).

Climate, livestock grazing, introduction of invasive exotic species, wildfire, recreation, and military activities had significantly altered vegetation communities in the post-European settlement period (Yensen 1982, p 39). In 1979, the NCA was still characterized by extensive shrub stands; however, the grass and forb understories have been significantly altered (Vegetation Map 1). After a series of large wildfires in the early 1980s and mid-1990s, shrub communities decreased significantly, and comprised approximately 37% of the NCA in 2001 (Vegetation Table 2.1, Vegetation Map 2). Vegetation in the remaining area is comprised primarily of invasive exotic annuals or seedings.

Vegetation Table 2.1. Vegetation Community Composition for the NCA Based on 2001 Remote Sensing Data. Percentages Within Each Area are Based on the Acreage Totals for the Six General Vegetation Classifications.

Vegetation Community	Total Acres in NCA	Percentage of Area				
		NCA	Management Area 1	Management Area 2	Management Area 3	OTA
Shrub	154,400	32	43	31	24	31
Shrub/Cheatgrass	21,100	4	4	3	6	6
Seedings	34,100	7	23	4	6	1
Sandberg/Cheatgrass	28,000	6	3	5	5	10
Cheatgrass/ Exotic Annuals	223,200	47	27	52	56	51
Bare Ground	15,700	3	1	6	3	1